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IRON AGE

THE NATIONAL METALWORKING WEEKLY

May 4, 1950

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Pre-Coated COLOR with the
Economy of Steel

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Thomas Strip
COLD ROLLED STRIP STEEL

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Nickel Coated
Lacquer Coated
Tin Coated
Chrome Coated

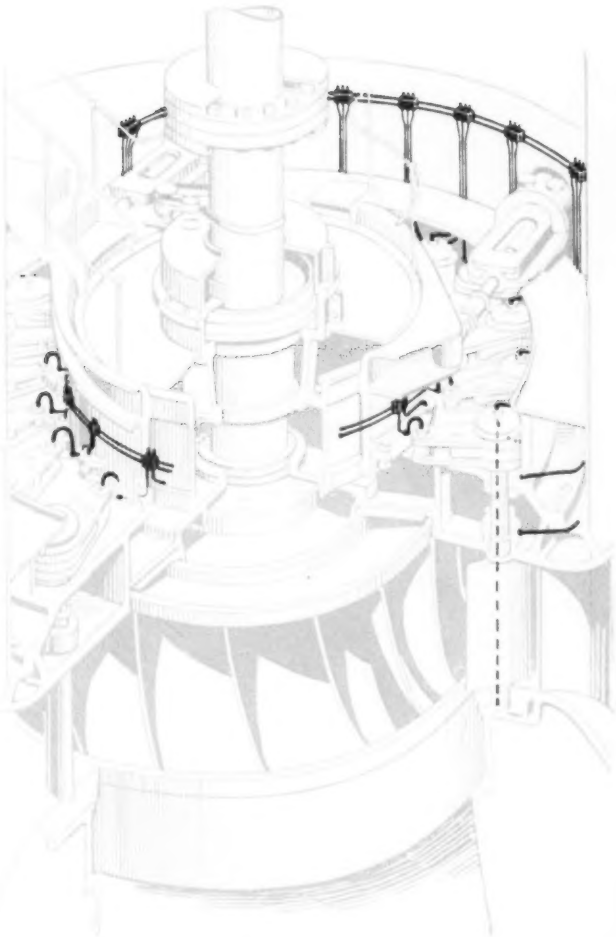
THOMAS STEEL CO. • WARREN, OHIO • SPECIALISTS IN COLD ROLLED STRIP STEEL
Electrocoated with Chromium, Nickel, Copper, Zinc and Brass • Hot Dipped Tin and Lead Alloy •
Lacquer Coated in Colors • Alloy Strip Steel • Uncoated Strip Steel • Produced to Your Specifications

Renewed only 4 bearings in 12 years with Farval

FARVAL solves the problem of lubricating turbines in hydraulic turbo-generator plants, according to reports from station managers.

On one Farval-lubricated turbine, only four bearings were renewed in 12 years. Prior to the installation of centralized lubrication it had been necessary at this plant to replace 6 to 8 bushings every six months, each time the turbine was dewatered.

Another plant engineer says, "After 14 years we are well satisfied with Farval. When our turbines were overhauled we found very little wear on moving parts and linkages." Still another man writes, "We would never go back to the individual grease fittings of years ago. You can bet that all future turbines will be equipped with Farval."



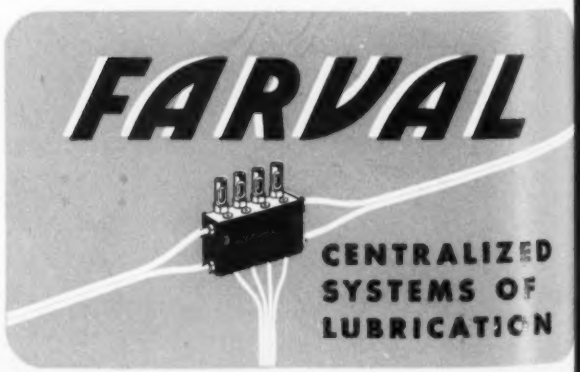
Shutting down a turbo-generator set to replace a worn or damaged bearing is expensive in labor and parts, costly in time and crippling to electric power production. Here as with so many operations throughout industry, Farval lubrication keeps equipment running efficiently, eliminating downtime and safeguarding production, not to mention the saving of labor, lubricant and new bearing costs.

Farval has proven itself in over 20 years of service. It is the original Dualine system of centralized lubrication that others imitate. The Farval valve has only 2 moving parts—is simple, sure and foolproof, without springs, ball-checks or pinhole ports to cause trouble. Through its wide valve ports and full hydraulic operation, Farval unfailingly delivers grease or oil to each bearing—as much as you want, exactly measured—as often as desired. Indicators at every bearing show that each valve has functioned. For a full description, write for Bulletin No. 25.

The Farval Corporation, 3252 East 80th Street, Cleveland 4, Ohio.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.

FARVAL—*Studies in Centralized Lubrication*
No. 110



These Specially Designed Fastenings

MEET SPECIAL NEEDS

The fastenings shown here are known as "specials," because they were specially designed and manufactured to meet particular or unusual bolting conditions. They were selected at random from among the hundreds of types of special fastenings being turned out regularly by Bethlehem's 78-acre plant at Lebanon, Pa.

Making special fastenings is in itself a specialty of Lebanon Plant. Fastenings with askew heads, split or curved shanks, forged-on washers . . . fastenings so small you can grab a handful . . . fastenings weighing a hundred pounds or more each . . . Lebanon Plant makes them all. In addition, we also turn out a complete line of standard items, such as machine and carriage bolts, nuts, rivets and spikes.

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THE IRON AGE

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MAY 4, 1950 • • • VOL. 165, NO. 18

Special Issue

This week's Special Issue has as its theme the Foundry Show at Cleveland, May 8-12. The foundry industry's latest developments are covered, including: (1) How the foundry industry is molding its future by developing closer cooperation with the nation's schools; (2) a new electronic method for drying cores; and (3) the latest specifications for ductile iron.

Issue Highlights

Current objectives of the Foundry Educational Foundation are: (1) To improve education in the field of foundry engineering; (2) to encourage and assist foundry engineering students; and (3) to develop adequate instruction to carry out these purposes.— p. 83.

Dielectric driers produce better sand cores more economically. Synthetic resins as binders perform well at high temperatures. The electronic heating equipment used is completely pushbutton controlled from start to finish, and may be operated by unskilled labor.—p. 90.

Steel officials expect capacity operations to continue through the second quarter, and some are predicting they will extend through the third quarter. With capacity now about 100 million tons per year, these high operations would mean a new second quarter production record. Maybe an earnings record, too.—p. 105.

The veils concealing the basic purpose of the steel monopoly probe were parted for an instant last week to show clearly that a foundation is being laid for a Justice Dept. suit to dismember the nation's largest steel companies.— p. 107.

Iced-blocked conditions on the Great Lakes have stalled the opening of the iron ore shipping season. Shippers are now faced with the staggering problem of moving 80 million tons of ore in a shortened season. An ore shortage may result.—p. 108.

Coming Next Week

Stainless steel users need a clear understanding of the characteristics of the great variety of compositions available in order to pick the right material for each application. Characteristics of these stainless steels and heat treatments for obtaining desired properties are outlined in first half of a two-part article.

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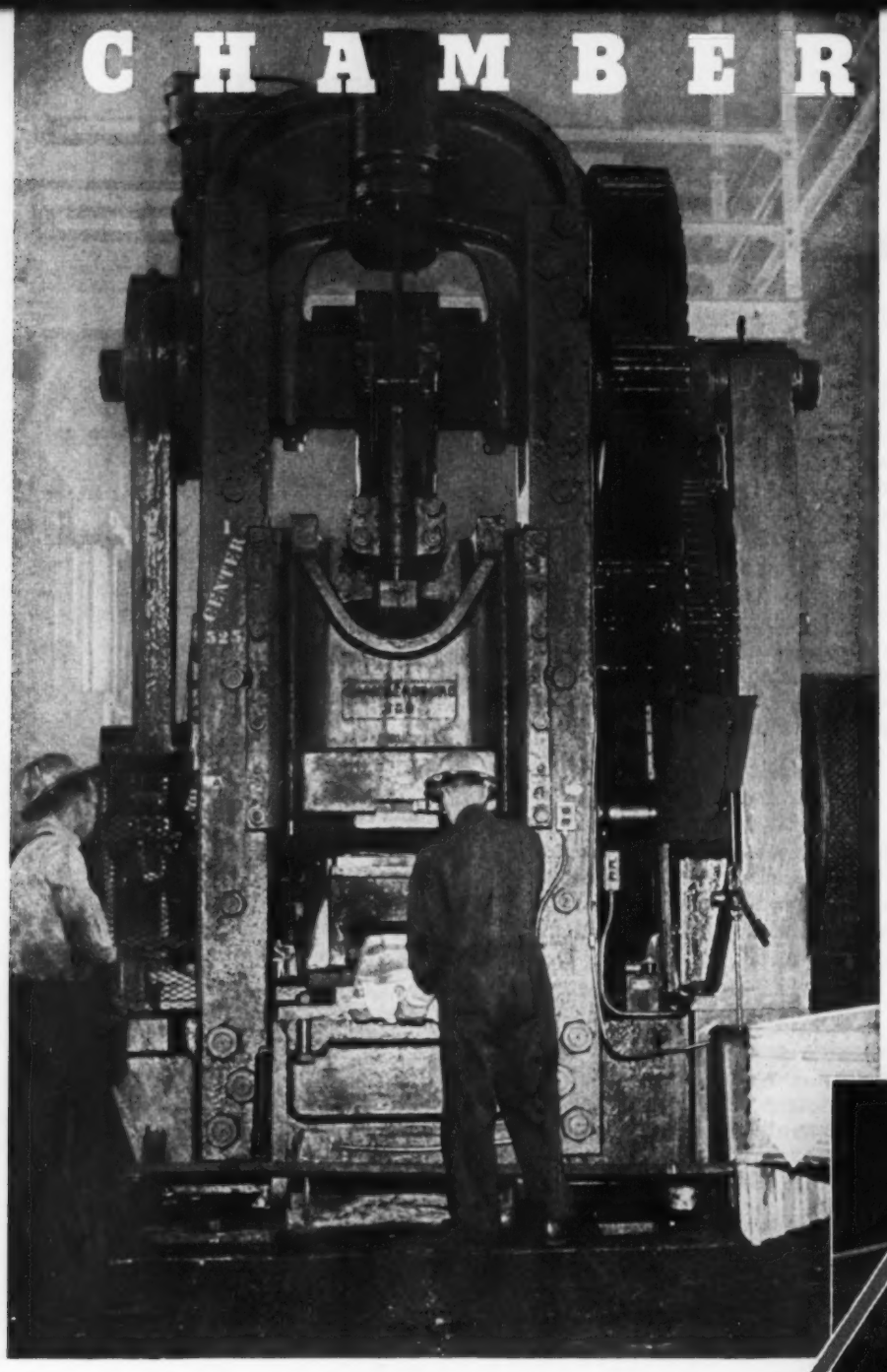
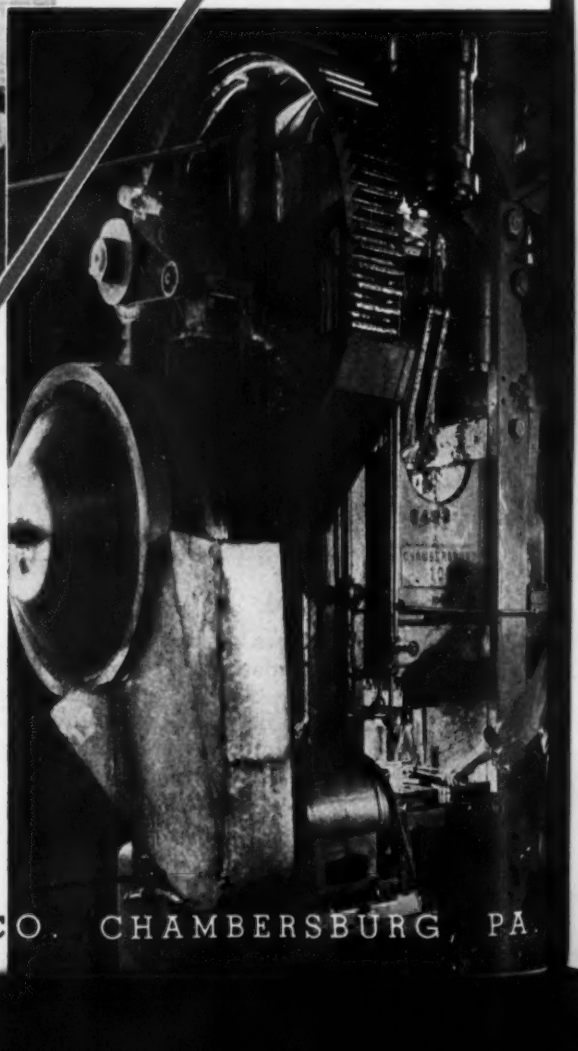


Here is something to consider when in the market for a trimming press:



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May 4

Editorial

INDUSTRY VIEWPOINTS

Lost By Default?

MY friend Breezy knows quite a few big shots in steel and other metalworking plants. I saw him the other day and he was burning up. He was all upset because industrialists were taking a chance of losing the battle of Washington by default. But let Breezy tell you his conversation:

"I said look, if you fellows don't stand up on your hind feet and tell your story you're going to be out of luck."

"And another thing. Those fellows in Washington and some places of learning believe a lot of the malarky they hand out. They are fanatics on it. Sure they don't know an ingot from a button hook but they think they know what we all ought to do."

"Yes, I know you don't always get an even break in the papers. But the papers are busy. They give space to the first fellow that takes a sock. If you aren't right there with the answer they can't hold the presses for you."

"Yes, I know they won't always put in the paper what you have in the handouts. But that's nothing. These boys in Washington use five-cent words, they accuse you of everything under the sun. If you are going to answer them you have to get up and speak. You have to be quoted. And you can't get quoted if all you say is 'Lies, lies'."

"Sure, you're busy. But I am telling you that if you don't get going and tell and retell the stockholder, the public and your employees what gives in plain simple down-to-earth language you aren't going to have any business to run someday."

"Sure, I know you think it is tough about the steel industry. But it is tough for you too. If steel is taken over by the back way they will be after you next."

"Sure, I know you want to do your part but stop talking about it and accept some of those bids to tell your story."

"What's that, no one asks you. That's not right. I was talking to some radio people the other day and they told me that they have the hardest time getting businessmen to tell their side of the story. Well, so long friend, but for the sake of old times, loosen up and let loose with the facts. Shout it from every podium you can get up on. Because if you don't, you won't have any podium to speak from."

Take a tip from some of the top steel men who've been really telling their story in Washington during the past week.

Tom C. Campbell

Editor

Now! a better way

Crucible
TOOL STEEL SELECTOR
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CHARACTERISTICS
HEAT TREATMENT
Each tool steel application falls in one of six major classes. To select the right tool steel for your application:
1. Select the major class on outer ring which covers application.
2. Select the sub-group which best fits the application.
3. Set arrow on each grade in the sub-group and note its characteristics and typical heat treatment.
4. Select the tool steel which, in your judgment, is required.
GRADE
AIRDI 150
WEAR RESISTANCE
CUTTING TOOLS
GENERAL PURPOSE
SPECIAL PURPOSE
IMPACT TOOL
GENERAL PURPOSE
MACHINE CUT MOLDS
PLASTIC MOLDING
COLD HUBBED MOLDS
HIGH TEMPERATURE CASTING ALUMINUM & MAGNESIUM ALLOYS
DIE CASTING
LOW TEMPERATURE CASTING ZINC & TIN ALLOYS
METAL FORMING—COLD
SPECIAL PURPOSE
GENERAL PURPOSE
LONG TIME CONTACT WITH HOT METAL
METAL FORMING—HOT
SHORT TIME CONTACT WITH HOT METAL

Here's how it works:

To use the Selector, all you need know is the characteristics that come with the job: type and condition of material to be worked, the number of pieces to be produced, the method of working, and the condition of the equipment to be used.

FOUR STEPS—and you've got the *right* answer!

1. Move arrow to major class covering application
2. Select sub-group which best fits application
3. Note major tool characteristics (under arrow) and other characteristics in cut-outs for each grade in sub-group
4. Select tool steel indicated

That's all there is to it!

Here's an example:

Application—Deep drawing die for steel

Major Class—Metal Forming—Cold

Sub-Group—Special Purpose

Tool Characteristics—Wear Resistance

Tool Steel—Airdi 150

One turn of the dial does it!
And you're sure you're right!!

NEWSFRONT

NEWS, METHODS AND PRODUCT FORECAST

► A major iron ore company is expected to open up a new open pit iron ore mine in the Lake Superior district within the next 30 days.

► Top officials of the Canadian government are privately worried about their difficulties in buying arms and aircraft parts from the U. S. They'd probably have no problem if, like Western Europe, they were willing to take them for nothing. Trouble is they want to pay for them. In return they would sell the U. S. certain armament items that outperform comparable U. S. products. The "Buy American" Act stops them.

Among the items are a new jet engine, a new all-weather fighter and some advanced anti-submarine equipment.

► An impregnated plastic, modified, is now being tried for compressor blades of aircraft turbines for use in the early stages where temperatures are relatively low.

► The French have adapted the electrical resistance strain gage technique to dynamic testing of bicycle frames. Some 40 gages are applied to the cycle frame and connected by cable with recording equipment in a truck to follow the rider in actual road tests. Results show that frame weight can be cut in some areas.

► Sulfur removal in the soda ash treatment of basic iron has been improved by using a stabilized dolomite lined ladle. The dolomite can be pressed into bricks for large ladles. Some small shops are now removing sulfur twice as efficiently with this method.

► Kaiser Aluminum has worked out a new plating process for die cast aluminum that permits production of plated garnish automobile moldings that will cost less than either plated stamped steel or plated die cast zinc.

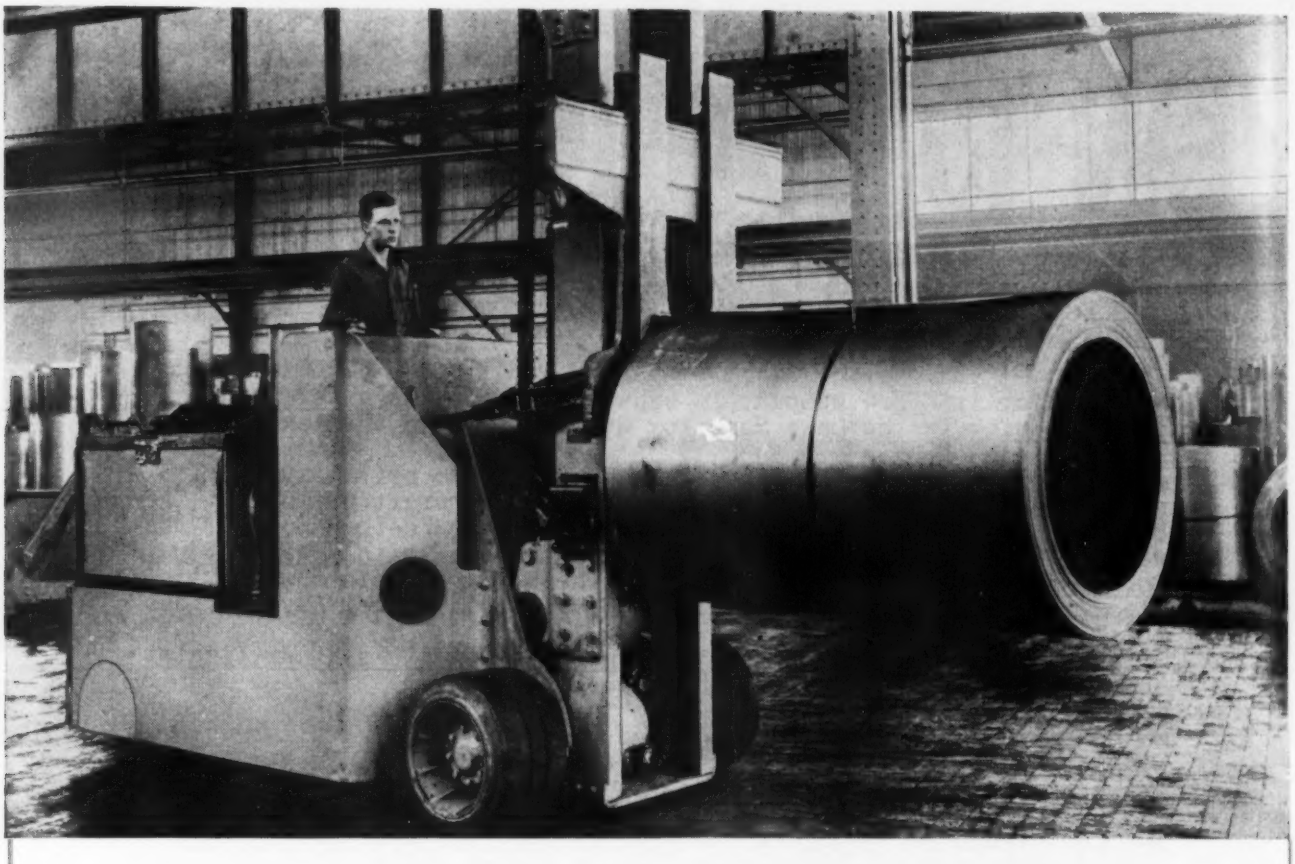
► A T.C.& I. engineer has reported a new process that neutralizes waste pickle liquor and evaporates its water. Technique is to pour molten blast furnace slag into the liquor. This not only disposes of the waste liquor problem but granulates the slag and produces a porous product that improves raw commercial fertilizers.

► Norwegian engineers have a new process for beneficiating magnetic taconite which they claim is superior to any yet tried.

► More than the usual number of North American machine tool builders will visit the Canadian International Trade Fair which opens May 29 in Toronto. Reason is that British machine tool builders will have a big exhibit on which they'll spend $1 million. The U. K. government is paying 35 pct of this cost as part of its drive to build up machine tool exports.

► The Navy is running accelerated dynamic tests of ferritic and austenitic steel steam pressure tubing using steam at 1050°F and 2000 psi. Some 4000 start and stop tests, equivalent to 20 years of normal operation, plus thermal shock tests, have produced no ruptures to date.

► Business note: Most chemical firms will spend as much on plant expansion this year as they did in 1949; some will spend more.



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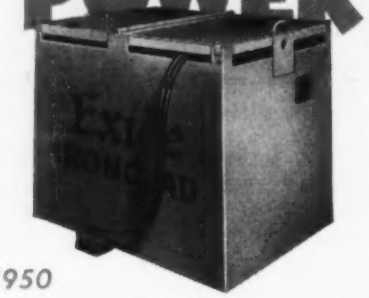

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Production Records Tumble

Consumers Worry Over Costs

Scrap Prices Set New High

The Iron Age SUMMARY

IRON AND STEEL INDUSTRY TRENDS

THE steel industry is well on its way toward setting a new production record in the second quarter. Last week the industry shattered all weekly records by operating at 100.5 pct of rated capacity. That scorching pace is being continued this week. Barring unexpected trouble, a record breaking second quarter looks like a cinch.

This prediction is based on the following factors: (1) Operations are expected to remain near 100 pct of rated capacity. (2) The industry's capacity is larger than it has ever been. Counting expansion this year, it is about 100 million tons a year. (3) Current record breaking production is supported by terrific demand, which is general for nearly all major steel items. (4) Inventories of steel users are not large, are in fact considered unsatisfactory in many cases. (5) Traditionally cautious steel officials are predicting capacity output through the second or third quarter. (6) Steel company order backlogs are bigger (they average about 5 months at current production rates), and pressure from consumers is still growing.

How Steel Heads View the Market

How long will torrid consumer demand keep the steel market boiling at this record level? Steel officials know it can't last forever. They are divided on whether the tapering off will begin in the third quarter or in the fourth quarter. But they are agreed that when it comes it will be a gradual tapering off. They don't expect a sharp slump in steel business this year.

In an effort to satisfy as many customers as possible, some mills have been forced to make arrangements that are costing them money. In short, the mills themselves are involved in conversion deals. It works this way:

The producers sell semifinished steel to nonintegrated mills which transform it into flat-rolled products. Then the mills buy back the finished product and ship it to their customers. It's an arrangement that the integrated mills don't like and they wish they could avoid. The only ones who make any money on the deal are the mills that produce the flat-rolled. The basic producer loses money.

Consumers Worry About Costs

Steel consumers are worried about their costs. They don't expect any increase in regular mill prices for steel products. But many of them have already been forced to shell out extra money for conversion and premium priced steel. They aren't kidding themselves. They know they are selling in a buyer's market, and competition is getting keener, not easier. Any addition in costs must be lopped off profit margins, which aren't large to begin with.

Even with Chrysler out of production, auto output is at an annual rate of 6,400,000 vehicles. Production so far this year is about 250,000 units above 1949. There is still no hint of any break in this schedule. Although Kaiser-Frazer was halted 2 days last week because a vendor ran out of steel, this situation has been corrected.

Cold-rolled sheet deliveries in Detroit are running 4 to 6 weeks behind schedule. Hot-rolled sheet deliveries are also being extended by about a month. And bar stock is being sold in record tonnage. Meanwhile, one large Chrysler supplier has stopped buying steel for that account. They are already stocked to the gills, and are carrying an $8 million inventory for that single client.

Scrap Getting Rambunctious

Encouraged by the record pace in steel, the scrap market is again flexing its muscles. Price advances were scored in nearly all areas and most grades were affected. THE IRON AGE steel scrap composite price soared well above $30 a ton, setting another new high for the year. The scrap market is turgid. It is threatening to break through the restraints of consumer caution which have been acting as a drag on its inflationary spiral.

SELL MORE—The quality of your product is reflected by the combined qualities of all the components making up your product. A skimping here and there lessens the costs, but often proves a costly lesson. It takes many satisfied customers to make up for the loss of one dissatisfied customer. To sell more you must gain satisfied customers.

SAVE MORE—Many manufacturers have discovered the economy of using Wolverine tube as a basis for fabricating their tubular parts.

Wolverine tube can be made to assume many shapes—coils, spirals, coils within coils, odd bends, special end forms—and can be designed and produced for you with full appreciation of your requirements.

STRIVE FOR—lower break-even points—for lower costs in construction and assembly—for better products with longer life—for sharper reductions in maintenance and replacement costs.

SEND FOR—a copy of the brochure "Wolverine Fabricated Tube Parts." It shows how non-ferrous tube has been formed in various ways to meet our customers' needs. It may suggest a better way of handling a component of your product. Ask for a copy on your stationery.

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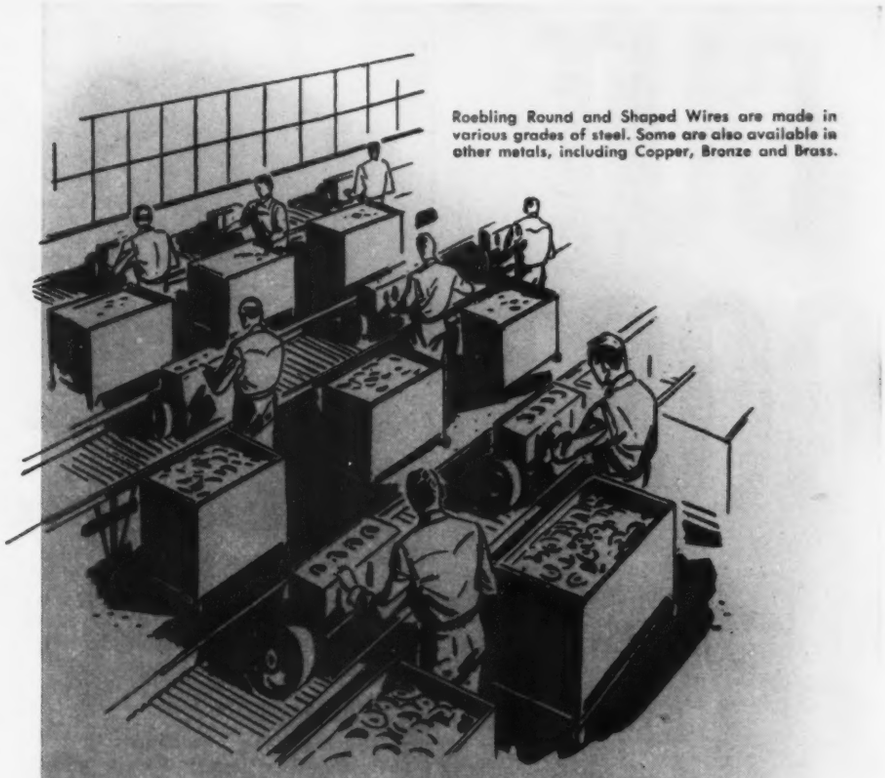

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CUT COST

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Over 40 years' experience designing, manufacturing and installing material handling equipment.

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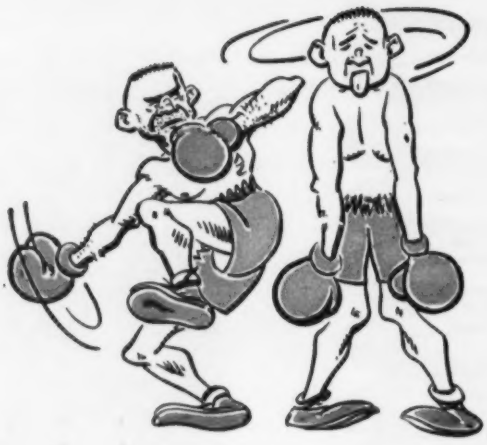

Fatigue Cracks

By Charles T. Post

Say It Again?

Saw by the newspaper that a Westchester County man is going to turn his farm into a country theater and a "museum of hippology." Our first reaction to *hippology* was, "By golly, we've lived to see the passing of an age. The gent's going to preserve the memory of burlesque in a museum. Probably with busts of Gypsy Rose Lee, Ann Corio and some of the old timers."

But when we got to the nearest dictionary, we found "hippology: study of the horse." Neigh-h-h-h.

Then the brains department sent over a press release from John Wiley & Sons, the book publishers, announcing publication of "An Index of Nomograms." We only had to read half way down the page to find that nomograms are "graphical devices designed to yield quick, accurate solutions to mathematical formulae"—some of them right in the metals and machine tool field.

And finally, someone tossed on our desk a want ad from the *Saturday Review of Literature:* "Cybernetic secretary, efficient on electronic equipment and twice as beautiful, yearns for intriguing job, preferably abroad. Box 798-D."

Day was when you could carry on an intelligent conversation with a few hundred words of basic English.

News

First definite announcement that U. S. Steel would build an Eastern mill near Trenton, N. J., came from board chairman Irving S. Olds at a press conference last Tuesday. That made it official, although there had been talk in the trade for a decade. But readers of your favorite family journal recall an unequivocal statement that the mill would be built in a signed article by Tom Campbell on page 109 of the Feb. 2 issue. That keeps Campbell's batting average for the season a good bit above DiMaggio's.

No Out

Add to the list of long-time fruitless occupations that of an inspector for Colonial Steel who has spent 40 years trying to saw his way through jail steel bars with no success. The company gives him the very best hacksaw blades, too, according to a piece in *Steelways* magazine. If Colonial and one of the hacksaw blade makers would make a joint project out of this, efficiency might be stepped up considerably for both.

Puzzler

If you want to check your tape measure on how far the courier walked to deliver the message to the front of the moving column and get back to the rear, H. Kelsea Moore, who submitted this old timer, says it was 2.4142 miles.

K. S. Frazier, research department, Detroit Steel Products Co., submits one that will stretch the imagination on a Spring day: An earthworm was sunning 1 in. of his body when spied by a robin. The first tug stretched the worm to twice its normal length exposing 3¾ in. Using its tail for an anchor, the worm contracted to normal length. In five additional tugs, the worm was entirely out of the ground. How long was the worm?

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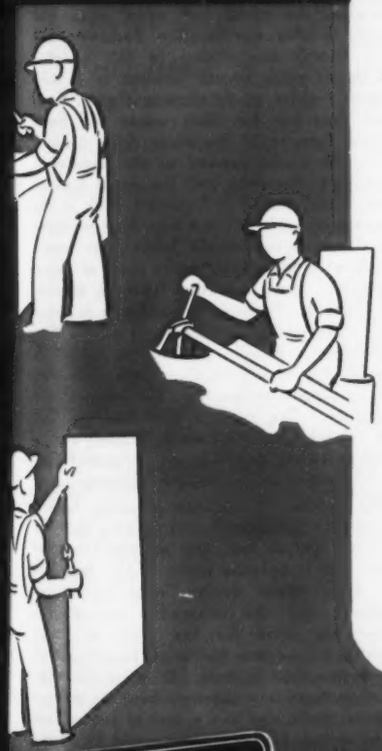

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Dear Editor

Letters from Readers

Italian Steelmaking

Sir:

I read with great interest your notes on the economics of tonnage steel melting in the electric furnace in the issue of Dec. 8, 1949.

Your article and comparison has been of great interest to several managers of works like our own, which operate contemporaneously the electric furnace and open hearth furnace. As you know, in Italy steel melting by electric furnace has been used for many years and has been very successfully developed. The reason is that, while Italy does not produce ore or coal, it has a rather important power production. The first electric furnaces were established in Italy before 1900.

Now several factories are producing carbon steel and alloy grades with electric furnaces in a perfect working order and with up to date installations. For instance, in my works I have four electric furnaces, all working during the summer time, while during the winter we have one open-hearth furnace practicing (because the electric power is restricted during the cold season).

You will be very pleased to hear that the Italian Steel and Iron Association, in its last monthly report, has published a translated summary of your article. I would like to congratulate the author for his most useful remarks, though I am keen in pointing out two or three things which sounded strange to me.

In Table III (the approximate costs of the open hearth and the electric furnace methods) in my factory the comparison is made between a 50-ton open hearth furnace and 25-ton electric furnace producing daily about the same tonnage. The open hearth furnace produces about 3 tappings a day and the electric furnace 6 tappings. When you compare the operating labor between the open hearth and the electric furnace in Table III, you show $1.50 for the open hearth and $2.40 for the electric furnace: I could not understand this difference because the operating labor at the two furnaces in my factory is exactly the same, or only slightly dirent in favor of the electric furnace. The electric furnaces are top-charging, usually with one charge exceptionally with two charges every tapping. I cannot imagine how the operating labor is more expensive in a 50-ton or 70-ton electric furnace than in a 175-ton open hearth furnace.

I obtained the same results with refractories: The cost of refractories in our open hearth furnaces is more than in the electric furnaces.

ALDO ALLIATA
President
Metallurgica Vittorio Cobianchi
Milan, Italy

Mr. Alliata's letter was forwarded to H. W. McQuaid, author of the article referred to, who replied as follows:

"It was a pleasure to receive your interesting letter: I can well imagine the difficulty you might have in trying to determine why in the article I showed the cost per ton for electric furnace labor at $2.40 and that of the open hearth at $1.50.

These labor costs were given because for the open hearth they represented the average of several open hearth plants where the principal product was carbon steel. The high electric furnace figure was for an electric furnace tonnage plant with an unusually high incentive bonus over the standard CIO (union) rates. There are several electric furnace high production melt shops whose labor costs were under $2.00 per net ton before the last steel strike, but I hesitated to go below $2.40 for my general figures because I did not wish to be criticized for undue leaning to the arc furnace.

There are some open hearth plants which have lower cost above material than those I gave, but these plants are not representative of the usual hot metal shop and usually involve combination Bessemer and open hearth operation. In this country, the larger open hearth furnace in a well-operated plant would show a slightly lower labor cost per ton than would the basic electric furnace of the same daily production. This would depend on the number of furnaces in the shop and the exact type of steel made, but it is believed that in the larger shop with at least four high-powered arc furnaces the direct labor cost would be close to the open hearth shop of equal capacity. The production from an electric arc furnace, if power is available is much more affected by the operator's efforts than is the open hearth, so that in order to achieve the high operating rate necessary for maximum production an incentive is necessary. The reward both to the men and to the company which comes with a good incentive bonus is an important factor in electric arc furnace economics.

The number of charges of scrap in the top charge furnaces in this country are seldom as low as two and usually three or four. This is because many of the furnaces are of obsolete design, even when top charged, and the volumetric capacity is either too small for the type of scrap charged or we are trying to tap heats of larger size than in Italy. It is for this reason that there is a constant trend to deeper furnace shells and every melter knows that a one or two bucket charge would be of the greatest help in increasing his production.

It has been my experience that the refractory cost of the really modern high production arc furnace is definitely lower per ton of ingots than the modern open hearth, but it is difficult to put this down in an article for publication because of the great difference between individual electric furnace operations."

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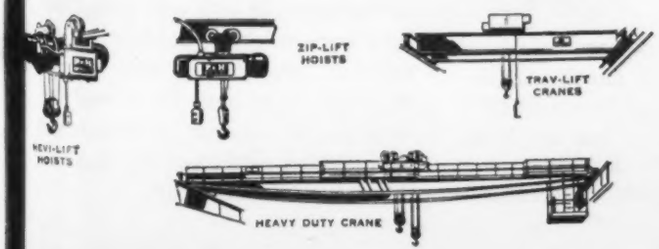

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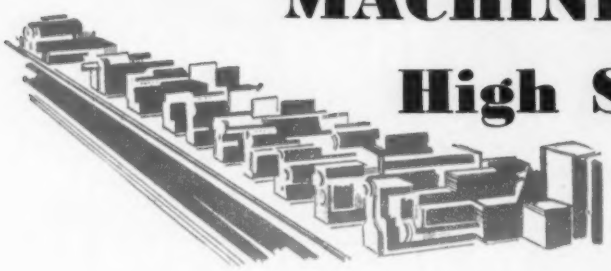

Sales Inquiries and Production

Portents of better business just around the corner seen . . .Detroit automakers add to optimism . . . Arsenals, other fields add demand.

by William A. Lloyd

Cleveland — Forecasting in any industry is a perilous practice, but the shape of things to come for the machine tool industry for the next 60 days at least prompts an optimism that has already infected some of the industry's most conservative elements.

In Detroit, machine tools, like springs, are busting out all over. The Ford engine program, according to the trade, is rolling along at a fast clip. Placements for the Ford six and eight are already being made, it is reported. Present indications are that commitments for the new Lincoln and Mercury engines will begin in another 30 days. Quotations for new tooling on these jobs have already been requested.

Chrysler Handicapped

A second area of activity is Chrysler. During the strike period, Chrysler has been seriously handicapped in its tooling program. A log jam (of paper work and other details) has piled up that will not be easy to clear. The duration of the Chrysler strike effect, as in all the other automotive strikes, promises to be much longer than the strike itself.

The third segment of activity is General Motors. While GM's new plans for a six-cylinder engine are still vague, there has been much activity in various tool rooms. Some of the divisions already affected are Chevrolet-Flint, Buick, Chevrolet, Cadillac, and Chevrolet Gear & Axle. These are in addition to Detroit Transmission Div., which has been prominently mentioned in recent IRON AGE dispatches from Detroit.

Ford Engine Debut

The exact purpose of the General Motors program—in addition to plant modernization — is not clear. However, tooling experts have pointed out that, with the new equipment, General Motors will be in a position to make a much larger number of its jigs and fixtures than in recent years. There are as yet, however, no definite indications that the corporation has any such plans in mind.

From present reports, the new Ford engines can hardly be expected earlier than January 1951 and Chrysler may lag at least several months behind this.

In other markets, government programs for arsenals, aircraft engines, (a possible 500 million) and airframes, promise to produce a substantial number of placements. Producers of these items have been asked to step up their output. In addition, the arsenals have been given funds for a machine tool rebuilding program, part of which will be used for conversion of gun machinery to carbides.

Other Industries Enter

In addition to automotive demand, other industries are entering the machine tool picture, including producers of home appliances, farm implements and plastics fabricators. Press makers are doing rather well.

To some observers these developments, parallel or otherwise, add up to a growing conviction that now is the time to get plant and equipment in shape. Industry sources hesitate to estimate what part of this is a dividend of the replacement selling program, but it is certain that this program is beginning to pay off.

New Orders Needed

On the other hand, the machine tool industry, which is operating at about 40 pct of capacity when the steel and the automobile industries are at the peak, can well use a further increase in new order volume. According to National Machine Tool Builders' Association, industry is replacing only 2 pct of its machine tools a year, which provides a yardstick of the potential market, if nothing else.

In addition, distribution of the present business is anything but even. Some companies are putting on additional men, but for others, the present trend is still on paper.

In most areas inquiries continue to be received at a lively pace. But there is still a lot of resistance to be overcome in order to turn them into firm orders. Leaders in the industry are still of the opinion that their best hope for a real upturn lies in a change of antiquated depreciation rules, and the fight on this issue is continuing.

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A new approach to correct selection of tool steels, in which the application dictates the choice of steel, has been evolved and reduced to chart form. The new technique has been incorporated in a 9-in. circular selector chart, based on 22 readily obtainable tool steels which will meet the requirements of practically any application. This attractive selector, available to any metalworking shop, will prove an invaluable addition to the tool and die maker's tool box, especially in smaller shops not having a trained metallurgist. *Crucible Steel Co. of America. For more information, check No.* 1 *on the postcard.*

Micro-Drilling Data

Precision drilling of holes as small as 0.001 in. diam on a production basis is possible with the Model No. 1 Ultra-Sensitive Microscopic Precision Drilling Machine described in a new brochure. Much useful information on micro-drilling is presented, along with a complete description and prices of the equipment. *National Jet Co. For more information, check No.* 2 *on the postcard.*

Abrasive Wheel

Now you can rough and finish grind with the same wheel, a fact pointed out in the attractive new 6-p. folder describing the Norton Reinforced Hub bonded abrasive wheel for portable machines. Some of the many jobs it can do are described and illustrated, showing wide versatility of these wheels in foundries, welding and metal fabricating shops. *Norton Co. For more information, check No.* 3 *on the postcard.*

Centerless Bar Turner

Increased production, reduced grinding costs, fully automatic operation, small diameter bar turning and application to any ferrous or nonferrous alloy are some of the features of the Medart RFPD centerless bar turner, as described in a new 4-p. folder listing specifications and other Medart products. *Medart Co. For more information, check No.* 4 *on the postcard.*

Cold Heading Hints

An informative folder entitled "Cold Heading Hints for Reducing Fastener Costs" describes the advantages of cold heading over machining in the production of fasteners. The folder contains descriptive diagrams and essential information concerning correct methods of specifying cold heading to effect greater economy. *Continental Screw Co. For more information, check No.* 5 *on the postcard.*

Packaging Hints

Helpful facts on package reinforcement and the proper method of applying Steelstrap to improve packaging and car bracing are dealt with in a new illustrated folder describing Acme equipment for large or small packaging volume. *Acme Steel Co. For more information, check No.* 6 *on the postcard.*

Extrusion Presses

A new combined bulletin illustrating and describing the latest equipment for four distinct fields of extrusion includes presses for extruding (1) metals such as aluminum, copper and new alloys, (2) lead pipe and fittings, strip and solder, (3) lead encasing for hose and electric cable, and (4) carbon. *Lake Erie Engineering Corp. For more information, check No.* 7 *on the postcard.*

Tool Room Machines

Descriptions, specifications and features of the line of Hardinge high speed precision tool room machines are presented in a new 12-p. illustrated booklet. *Hardinge Brothers, Inc. For more information, check No.* 8 *on the postcard.*

Gear Reducers

A new line of heavy duty herringbone gear reducers for capacities up to 1000 hp are covered in a new 28-p. bulletin. It contains

Turn to Page 126

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New and improved production ideas, equipment, services and methods described here offer production economies. For price and other information, fill in the attached card and mail it.

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Abrasive cutoff machines for bar stock and shapes include units ranging from 3 to 15 hp. Types rated at 3 hp handle right angle to 45° bevel cuts, wet or dry operation, floor or benchmount models. All have Timken roller bearing-mounted spindle and trunnion. Capacity covers ¾ in. solids, 2 in. x 16 gage or 1½ x 3/16 in. tubes, formed light sheet up to 2 x 6 in. or equivalent areas. *Tabor Mfg. Co. For more information, check No. 19 on the postcard.*

Continuous Weld Pipe

Continuous weld pipe of Yoloy, a nickel-copper low-alloy steel, is now available. The pipe is easy to weld, bends and fabricates readily and has high tensile strength. Resistance to abrasion, shock, vibration and corrosion is high. *Youngstown Sheet & Tube Co. For more information, check No. 20 on the postcard.*

Diamond Abrasive Kit

For experimental and testing work, the new Dymo Shop Convenience kit containing the six most widely used Bureau of Standards grades of Dymo diamond compound, has been designed to produce almost any desired finish on carbides, tool steels and other hard materials. Each grade of the compound is distinctly color identified and contained in jars with matching color tops. *Elgin National Watch Co. For more information, check No. 21 on the postcard.*

Tin Content Indicator

The ratio of lead and tin content in solder can be determined with a new portable direct reading indicator. Up to 7 pct tin content of lead alloys may be tested in a matter of seconds. The instrument consists of a high resistance py-

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Continued

rometer and a plug-in type sensing unit. The meter movement with its processed coil is said to be highly resistant to shock, heat and vibration without loss of sensitivity. *Wheelco Instruments Co. For more information, check No. 22 on the postcard.*

Chemical Pail

Said to be practically indestructible, a new 3-gal drip-proof pail is made of Ace-Hide, a tough resilient, high-styrene, copolymer rubber that provides light weight, corrosion resistance and strength. The pail will not chip or crack and is easy to clean because chemicals cannot penetrate the impervious surface. An easy-to-read scale on the inside of the pail is marked off in half gallons. *American Hard Rubber Co. For more information, check No. 23 on the postcard.*

Load Stabilizer

For the rapid handling of full pallet multi-unit loads, a load stabilizer attachment for lift trucks clamps the load in position and permits safe, speedy lifting, carrying and stacking. It consists of a flat, rubber-covered steel plate mounted at the top of the special carriage extension; a double-acting hydraulic cylinder permits the plate to be lowered or raised over the load. The accessory is detachable so that the truck is available for regular handling operations. *Towmotor Corp. For more information, check No. 24 on the postcard.*

Boiler Feedwater Tank

A new, low-priced agitator tank for mixing boiler feedwater treatment solutions has a 53-gal capacity. It is built of heavy gage steel plate and is available with or without a hand agitator. Inside diameter is 22 in.; overall height excluding the hand crank is 36 in. The gate valve may be installed on either side. A chemical basket of heavy perforated steel plate facilitates the mixing of the treatment solution. This small capacity tank is useful with automatic intermittent feeders where larger tanks are often unnecessary. *Dearborn Chemical Co. For more information, check No. 25 on the postcard.*

Floor Resurfacer

The new Armor floor resurfacer is said to be four times stronger than ordinary concrete. Armor bonds to old concrete floors and can be laid as thin as ½ in., right over the present base. It will not shrink or break its bond; sets up overnight; and can be used within 24 hr. *Monroe Co., Inc. For more information, check No. 26 on the postcard.*

V-Belt Sheave

A new adjustable-diameter V-belt sheave has taper bushing and taper sleeve on which the flanges are mounted. This double-taper hub provides easy mounting and dismounting and rigidly locks the unit into a single, solid sheave, eliminating vibration, wear and fretting corrosion. Simultaneous movement of all flanges, when settings are changed, maintains V-belt alignment. *American Pulley Co. For more information, check No. 27 on the postcard.*

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A hydraulic unit designed for the No. 2 Hossfeld bender consists of motor, pump, cylinder and foot control. Full 180° bends can be made on standard pipe up to 2 in. The cylinder returns the swinging frame to its starting position rapidly while the operator feeds the stock. Overloading is prevented by a relief valve. *Hossfeld Mfg. Co. For more information, check No. 28 on the postcard.*

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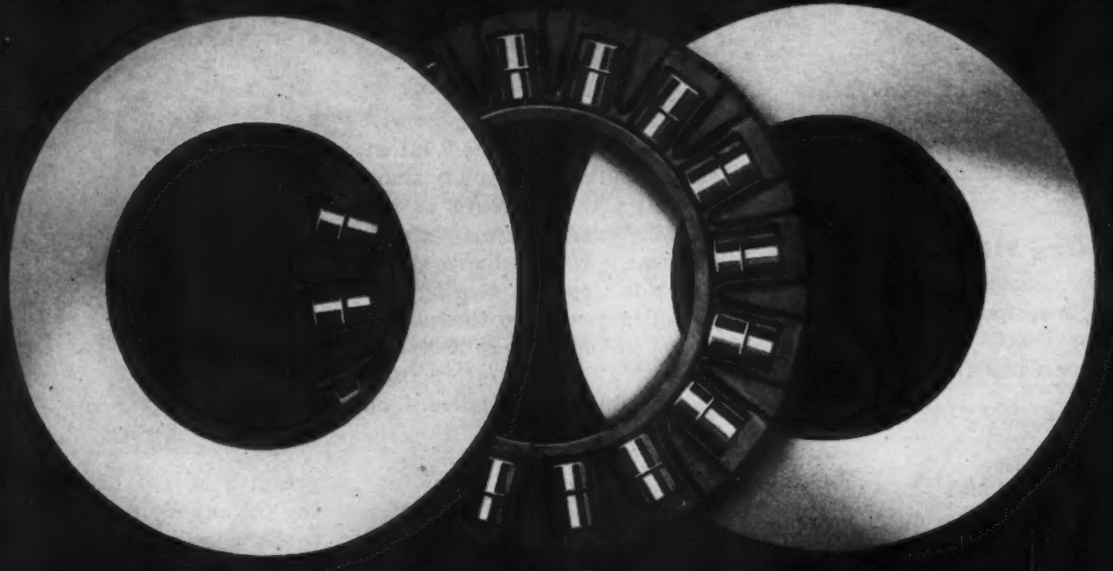

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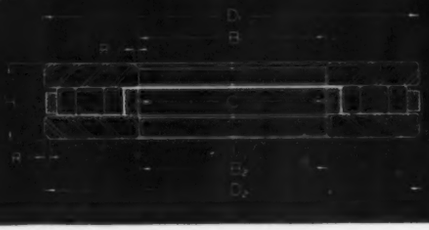

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RT-28	2.002	2.015	2.010	7.968	8.000	1.375	½	.062	65,400
RT-36	3.002	3.015	3.010	5.968	6.000	1.375	½	.062	**29,800**
RT-37	3.002	3.015	3.010	6.968	7.000	1.375	½	.062	**43,600**
RT-38	3.002	3.015	3.010	7.968	8.000	1.375	½	.062	55,600
RT-39	3.002	3.015	3.010	8.968	9.000	1.375	½	.062	67,500
RT-47	4.002	4.015	4.010	6.968	7.000	1.750	⅝	.062	**34,700**
RT-48	4.002	4.015	4.010	7.968	8.000	1.750	⅝	.062	**54,600**
RT-49	4.002	4.015	4.010	8.968	9.000	1.750	⅝	.062	**69,400**
RT-410	4.002	4.015	4.010	9.968	10.000	1.750	⅝	.062	89,300
RT-58	5.002	5.015	5.010	7.968	8.000	1.750	⅝	.062	40,300
RT-59	5.002	5.015	5.010	8.968	9.000	1.750	⅝	.062	63,300
RT-510	5.002	5.015	5.010	9.968	10.000	2.000	¾	.125	83,300
RT-511	5.002	5.015	5.010	10.968	11.000	2.000	¾	.125	111,600
RT-512	5.002	5.015	5.010	11.968	12.000	2.000	¾	.125	136,300
RT-69	6.002	6.015	6.010	8.968	9.000	2.000	¾	.125	48,300
RT-610	6.002	6.015	6.010	9.968	10.000	2.000	¾	.125	76,000
RT-611	6.002	6.015	6.010	10.968	11.000	2.000	¾	.125	100,100
RT-612	6.002	6.015	6.010	11.968	12.000	2.000	¾	.125	124,300
RT-710	7.002	7.015	7.010	9.968	10.000	2.000	¾	.125	62,400
RT-711	7.002	7.015	7.010	10.968	11.000	2.000	¾	.125	85,800
RT-712	7.002	7.015	7.010	11.968	12.000	2.000	¾	.125	109,200

ABOVE SIZES IN STOCK FOR IMMEDIATE SHIPMENT

KAYDON *Types of Standard or Special Bearings:*
Spherical Roller • Taper Roller • Ball Radial
Ball Thrust • Roller Radial • Roller Thrust

THE KAYDON ENGINEERING CORP., MUSKEGON, MICH.

All types of Ball and Roller Bearings 4" bore to 120" outside diameter

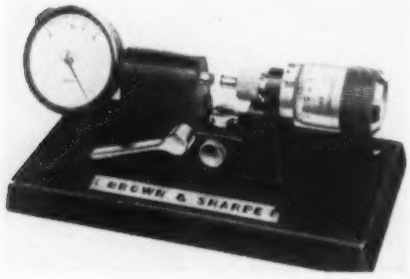
NEW PRODUCTION IDEAS

Continued

pressures of 75 psi. *Brown Instruments Div. Minneapolis-Honeywell Regulator Co. For more information, check No. 29 on the postcard on p. 37.*

Indicating Micrometer

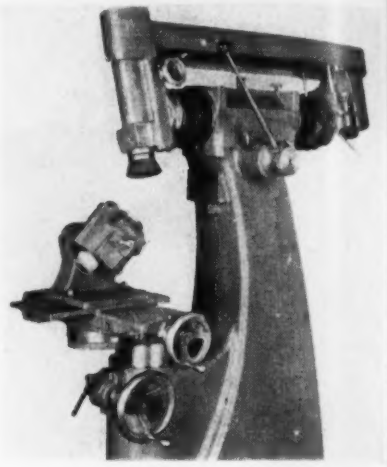
Three methods of measuring small parts are possible on the new indicating bench micrometer No. 245. It measures from 0 to ½ in.



directly from the micrometer thimble; it can be used as a comparator and is set without additional standards with readings to 0.0001 in. taken from the dial gage; and it measures by 0.0001 in. directly from the dial gage with micrometer set at nearest 0.001 in. of the measurement. An adjustable measuring pressure from 8 oz to 2 lb remains constant when set. The instrument is equipped with tungsten carbide tipped measuring surfaces for long use and threads are precision ground. *Brown & Sharpe Mfg. Co. For more information, check No. 30 on the postcard on p. 37.*

Cutter Grinder

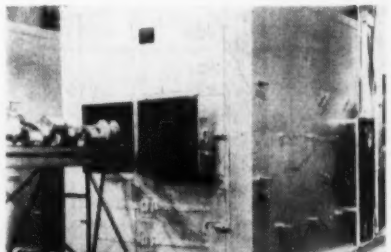
Finger touch operation is provided by an improved ram on the heavy duty Ace tool and cutter grinder; only 6 oz of pressure on the operating hand lever starts the movement. The horizontal ram which carries the grinding wheel spindle across the work is now mounted on a series of ¾-in. balls contained in hardened and ground steel tracks. The unit is rigidly confined and the balls move only in a predetermined position, with spring pressure maintaining the balls and track under constant



pressure at all times, compensating for any wear. Friction is said to be eliminated and the life of the machine greatly increased. The spindle drive is now equipped with V pulleys and belt that provide three grinding speeds. *Oliver Instrument Co. For more information, check No. 31 on the postcard on p. 37.*

Air Drawing Furnace

An air drawing furnace with capacity of 2000 lb per charge and a 1 hr charge cycle features a built-in recirculating gas fired heating

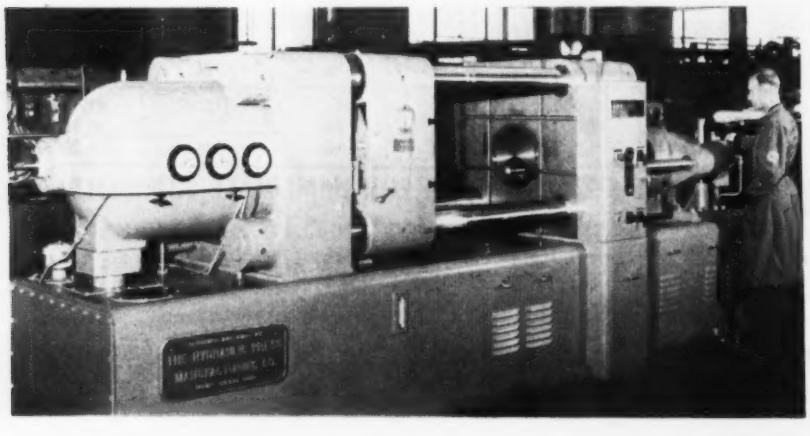


system that has capacity of 1 million Btu per hr and 900°F maximum temperature. It was designed for heat treating crankshafts. To assure uniform operating conditions each crankshaft is placed in an individual cylinder during the treatment process. Heated air at high velocity is supplied to the compartment through jets extending the length of the cylinders. Dampers control the flow of air in the supply and return openings

Turn to Page 128

Diecasting Machine

Magnesium, aluminum or copper alloy castings free of porosity can be produced in a selfcontained, all-hydraulic diecasting machine, by means of a high sustained injection pressure through the cold chamber injection system and by confining these pressures within the die cavities. The hydraulic clamp for live positive die closing and sealing of the die halves consists of a double action ram. Die movement, clamping, and injection plunger movement are automatically controlled and a hydraulic actuated cylinder provides automatic ejection of the casting. Die clamping pressure is 400 tons; maximum production is 125 shots per hr. *Hydraulic Press Mfg. Co. For more information, check No. 32 on the postcard on p. 37.*



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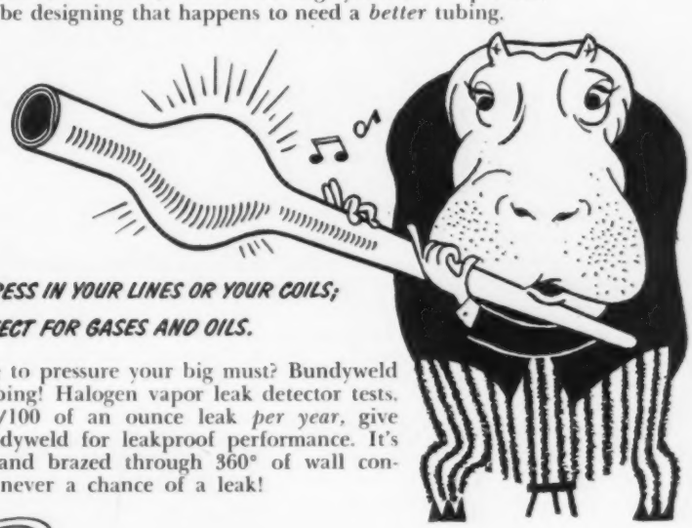
FOR SMOOTH, EASY HANDLING YOU JUST CAN'T COMPARE IT!

With all its sturdiness, Bundyweld is easy to cut, machine, form or join. It bends more readily and takes more bending without collapsing or weakening structurally. Your tip-off to faster, smoother fabrication and lowered costs of tubular frames, refrigerant lines, beer coils, radiant heating systems, or a product you may be designing that happens to need a *better* tubing.



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BUNDYWELD'S PERFECT FOR GASES AND OILS.

High resistance to pressure your big must? Bundyweld is still your tubing! Halogen vapor leak detector tests, accurate for 1/100 of an ounce leak *per year*, give honors to Bundyweld for leakproof performance. It's double-walled and brazed through 360° of wall contact. Virtually never a chance of a leak!

SO, make it a point to find out today
How *your* use of Bundyweld really can pay.
Be it nickel or steel or Monel, you will find
No other tubing so soundly designed.

EVERY INCH WE PRODUCE GETS A WHOLE FLOCK OF CHECKS
FOR FREEDOM FROM SCALING AND OTHER DEFECTS.

Bundyweld's wall thickness and concentricity are steadily held to amazingly close tolerances. No scaling! Coating, inside and out, is always smooth, clean, bright. Your inspection processes can be pared to a minimum, without delays for rejects. Still more Bundyweld savings for you.

FREE! Write today for new 20-page, illustrated booklet on Bundyweld Tubing, its properties, uses and how it can be fabricated, plus helpful information that may steer you to a profitable application of Bundyweld in your product. For your free copy, or queries on any possible use of Bundyweld, just call or write:
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ELECTROMET Data Sheet

A Digest of the Production, Properties, and Uses of Steels and Other Metals

Published by Electro Metallurgical Division, Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. • In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

Extra-Low-Carbon STAINLESS STEEL

New Type Chromium-Nickel Steels Have Added Corrosion Resistance

New and improved austenitic stainless steels of the 18-8 type have been developed which have superior corrosion resistance after being exposed to heat. These steels, known as extra-low-carbon stainless steels, were designed especially for use in welded and stress-relieved equipment that is exposed to more severe corrosive conditions than are normally encountered by other types of straight 18-8 stainless steel.

Under severe corrosive conditions, intergranular attack may occur in the higher carbon unstabilized grades of austenitic stainless steels that have been subjected to the temperature range of 800 to 1600 deg. F. during welding or hot forming operations. It is generally agreed that this type of corrosion is caused by complex carbides that are formed at the grain boundaries of the stainless steel during heating.

The effect of heat is rarely harmful in the ordinary fabrication of stainless steel for most applications, such as in architecture, the food and dairy industries, in hospitals, and in the home. However, in the chemical and other allied industries, where stainless steel is used in the handling of very corrosive chemicals, these new extra-low-carbon stainless steels should most certainly find wide use.

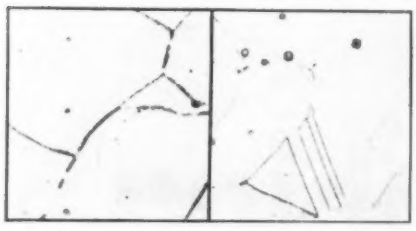


Fig. 1 Left: Carbide precipitation at the grain boundaries of an 18-8 stainless steel, containing 0.059 per cent carbon, after being held at 1200 deg. F. for 1 hour. Right: Absence of carbide precipitation in 18-8 stainless steel of 0.03 maximum carbon content, after being held at 1200 deg. F. for the same length of time.

In general, there are three ways in which the precipitation of carbides can be controlled in stainless steel:

1. Heat-treating so that the carbides present are dissolved.
2. Alloying with an element, such as columbium or titanium, that will tie up the carbon in the form of a harmless carbide.
3. Decreasing the carbon content of the steel.

Fig. 2. The new extra-low-carbon stainless steels are especially suited for large types of process equipment, such as this fractionating tower. They require no heat-treatment after welding.

Heat-Treatment After Welding

Before the development of extra-low-carbon stainless steel, or of the "stabilized grades", one means for preventing intergranular corrosion was to heat-treat stainless steel that had been subjected to the dangerous temperature range, so that the precipitated chromium-carbides would go back into solid solution. It was found that when a welded part was heated to temperatures of 1950 to 2000 deg. F., and then cooled rapidly, most of the carbides were retained in solid solution. This extra heat-treatment is sometimes impractical, however, because of the design or massive size of some types of welded equipment.

Use of Columbium and Titanium to "Fix" Carbon

As the result of a search for a method of producing stainless steels that would be immune to intergranular corrosion without heat-treatment, the columbium- and titanium-bearing stainless steels were developed. These elements form carbides more readily than chromium. It was found that columbium, when present in a 10 to 1 ratio to carbon, completely "fixes" the carbon and renders it harmless in stainless steel. A similar effect can be accomplished by alloying with about five times as much titanium as carbon. Steels thus alloyed with columbium or titanium are known as "stabilized grades."

Decreasing Carbon Content

The most recent development in preventing intergranular corrosion has been the extra-low-carbon stainless steels. To be substantially harmless in stainless steel for as-welded or welded and stress relieved chemical equipment operating at temperatures under 700 deg. F., carbon must not be present in quantities over 0.03 per cent.

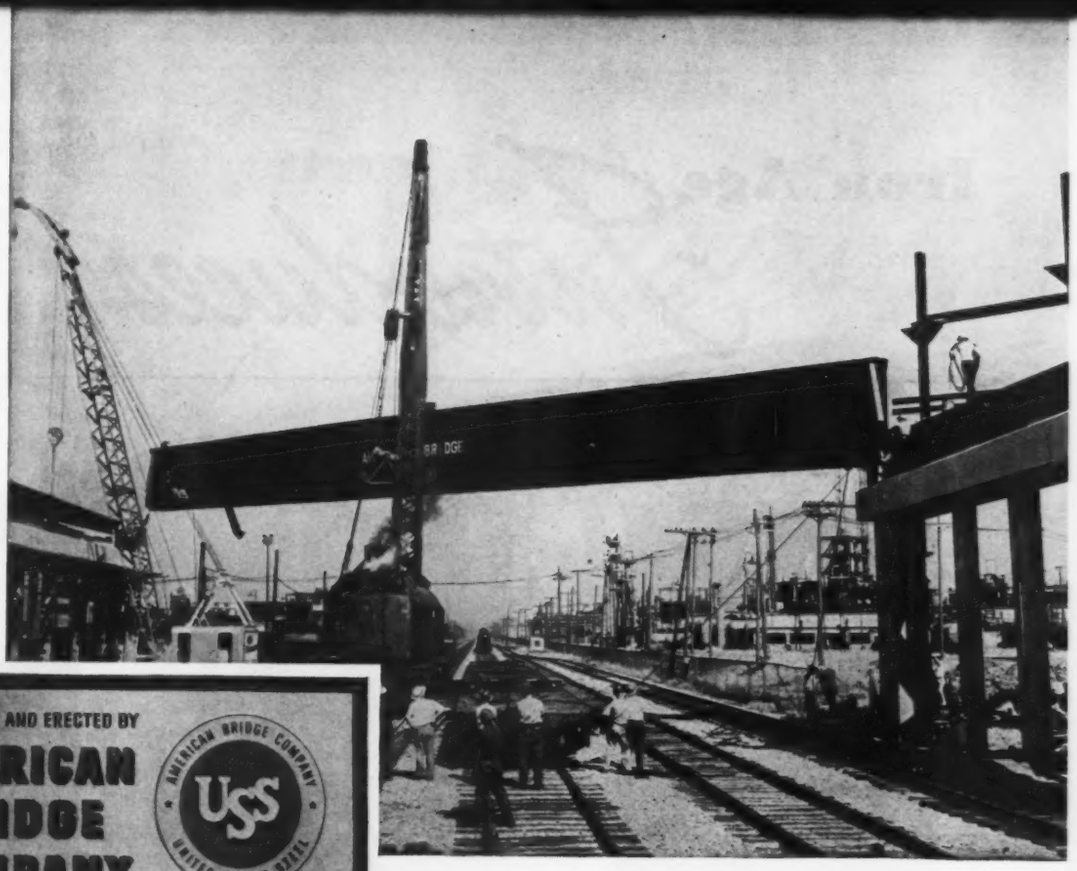
In 1937, ferrochrome with 0.03 per cent maximum carbon was first produced for the steel industry by ELECTROMET. This product has made it possible to produce very-low-carbon stainless steels—steels that are completely immune to intergranular corrosion when welded or subjected to a stress-relieving heat-treatment.

Metallurgical Service Available

If you use welded stainless steel equipment, it will pay you to investigate the advantages of using extra-low-carbon steels. If you produce stainless steel, our metallurgists will be glad to give you technical assistance in the use of ferrochrome of 0.03 per cent maximum carbon. For further information, write to the nearest ELECTROMET office.

For a more detailed account of the properties of extra-low-carbon stainless steel, write for a free copy of the technical paper, "Resistance to Sensitization of Austenitic Chromium-Nickel Steels of 0.03% Max. Carbon Content".

The term "Electromet" is a registered trademark of Union Carbide and Carbon Corporation.



...can Bridge erects an 88-ton, ...long plate girder span over ...Chesapeake and Ohio Railway ... in the yards of The Dow ...ical Company, Midland, ...igan. This structure was ...d without hindering rail traf- ...Darin & Armstrong, Inc., ...al Contractors; L. W. Mil- ...Consulting Engineer.

...ing highway overpass above ...Pennsylvania Railroad tracks, ... York Division, Mercer ..., Trenton, New Jersey. De- ...the maze of electric transmis- ...lines surrounding the work, ...e rail traffic below, American ... completed the job success- ...without interruption to traf- ...Kaufman Construction Com- ... Contractors; Designed by ...Jersey State Highway Depart-

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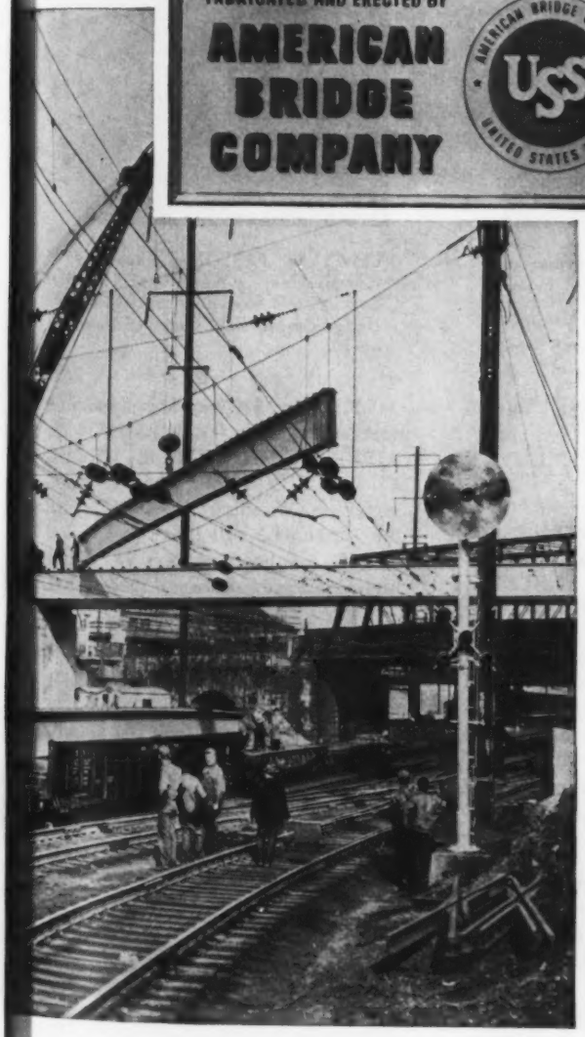

When erection will be under difficulties —*it's a job for* American Bridge

● We offer the erection of the plate girder span over the Chesapeake and Ohio Railway tracks at Midland, Michigan—and the erection of the highway overpass above the Pennsylvania Railroad tracks at Trenton, New Jersey, as substantial proof of this fact:

Regardless of how complex or difficult your job may be, you can be sure it will be done right if you call on American Bridge.

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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

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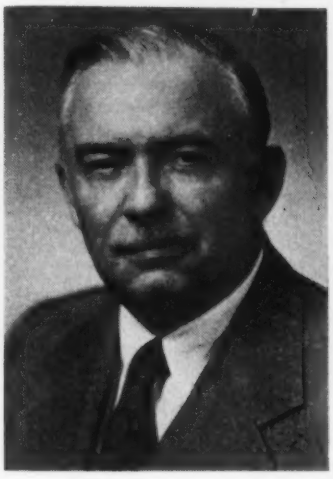
AMERICAN BRIDGE

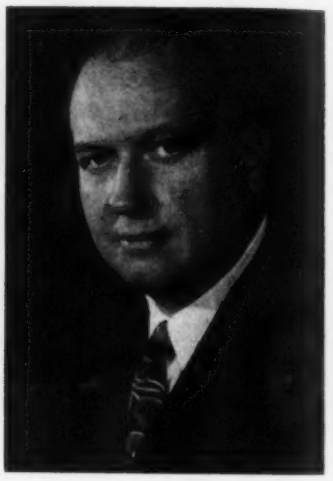
UNITED STATES STEEL

Iron Age *Introduces*

ROBERT W. LEA, president of Johns-Manville Corp., elected member of board of directors, Olin Industries, Inc.



F. S. ELFRED, elected member of the board of directors, Olin Industries, Inc.



LEWIS M. PARSONS, appointed vice-president, director and member of the executive committee, United States Steel Corp. of Delaware.

G. R. Hanks was elected chairman of the executive committee of TAYLOR-WHARTON IRON & STEEL CO. **O. DeG. Vanderbilt III** has been elected president and **O. DeG. Vanderbilt, Jr.**, will continue as chairman of the board and the company's chief executive officer.

Lawrence J. Kline was appointed sales manager of the automatic division by AUTOMATIC TRANSPORTATION CO., Chicago.

F. C. Shafer was elected president and chairman of the board of the IMPERIAL BRASS MFG. CO., Chicago. **C. H. Benson** and **J. T. Greenlee** were named vice-presidents.

K. A. Vaughan was advanced to the newly created position of manager of sales engineering for the GOULD STORAGE BATTERY CORP., Trenton, N. J.

Robert C. Blackinton was promoted to the position of plant manager of the PIONEER ENGINEERING & MFG. CO., Detroit.

Howard M. Graff has been named to the post of assistant general superintendent of INLAND STEEL CO.'S iron ore mines.

Carl E. Johnson was elected chairman of the board and **Earl Mendenhall** was elected president of STERLING ELECTRIC MOTORS, INC.

Bernard E. David joins ARCOS CORP., Philadelphia, as special field engineer, Los Angeles. **Walter Gordon List** will be special field engineer in the Ohio-western Pennsylvania territory and **J. J. Schlass** is the new sales representative in the Philadelphia district.

John S. Snyder becomes assistant manager of truck sales in the truck and fleet sales department of the Ford Div., FORD MOTOR CO.

Roland Wilkins, consultant for AMERICAN MACHINE & FOUNDRY CO., was placed in charge of sales for products of DeWalt, Inc., AMF subsidiary, in northern Texas, Oklahoma and part of Arkansas.

W. F. Boyer, Sr., has been appointed sales manager, foil division, for KAISER ALUMINUM & CHEMICAL SALES, INC. He will headquarter in Washington, D. C., until June 1 when he will move to Chicago to make his headquarters in Kaiser Aluminum's new general sales office.

Robert H. Schleuning is sales representative in western Pennsylvania, New York, northern West Virginia and parts of Ohio and Maryland for the Plymouth Locomotive Works Div. of the FATE-ROOT-HEATH CO., Plymouth, Ohio.

Robert M. Buddington is the new assistant manager of sales, sheet and strip division, for INLAND STEEL CO. He replaces **William P. Burke** who resigned.

J. P. Barnum was made sales representative for COPPERWELD STEEL CO., covering all of New England with the exception of Connecticut.

Ellsworth W. Crane was appointed mid-west regional sales manager for DURANT MFG. CO., Milwaukee.

Robert B. Moore was made manager of the mining division of GENERAL ELECTRIC CO.'S industrial engineering divisions. He succeeds **R. S. Sage** who is retiring.

Arthur H. Nolde has been appointed operating superintendent of the FALK CORP. machine shops, Milwaukee.

Albert N. Williams has been elected to the board of PITTSBURGH SCREW & BOLT CORP. **Harry W. Schuetz, Gerald J. Garvey** and **George E. Horney** were elected vice-presidents.

Walther H. Feldmann, who has resigned as president of ELECTRIC MACHINERY MFG. CO. OF MINNEAPOLIS, has been named vice-president in charge of sales for WORTHINGTON PUMP & MACHINERY CORP. **John J. Summersby** will become vice-president in charge of purchases; **Frederic W. Thomas,** general manager of purchases and **Carleton Reynell,** general representative, sales and purchasing departments.

H. H. Colombe was made export manager of the newly established Chicago export office of the OTTUMWA IRON WORKS.

T. E. Smith is the newly appointed manager of the air conditioning sales department of WESTINGHOUSE ELECTRIC CORP. Manager of the air handling sales department is Phillip Cohen. Both departments will be under the supervision of **J. C. Thompson,** general sales manager.

Herbert Bowman was appointed resident sampling representative in Philadelphia for LUCIUS PITKIN, INC., New York.

WILLIAM DAY, named assistant to the president and director of legal activities, Wyandotte Chemicals Corp.

Iron Age Salutes

DR. FRANCIS C. FRARY

DR. FRANCIS C. FRARY, director of research for the Aluminum Co. of America, if he wishes can bedeck his laboratory smock with a chestful of medals for scientific achievement. But being a modest man he chooses to let them glitter in the confines of their cases.

His latest acquisition is the James Douglas Metallurgical Medal for 1950, presented by the American Institute of Mining and Metallurgical Engineers. In previous years, he has received the Gold Medal of the American Society for Metals, the Perkins Medal of the Society of Chemical Industry, the Acheson Gold Medal and prize of the Electrochemical Society and the Pittsburgh Award of the American Chemical Society, Pittsburgh Section.

This acclaim of the scientific world is evidence that Dr. Frary preserves throughout the years his incisive intellectual curiosity and his credo of rugged individualism in science.

In his presidential address before the American Electrochemical Society in 1930 he stated: "The research worker must not let his preconceived ideas or a desire to please his superiors by approving their pet theories interfere with the accuracy and thoroughness of his work. Neither must he be afraid to face the facts when they are disconcerting."

An alumnus of the University of Minnesota, Dr. Frary received his doctorate at the University of Berlin. Little known is his membership in the national intercollegiate championship gymnastic squad of 1903.

While with the Oldbury Electrochemical Co., Dr. Frary developed a process for the production of phosgene gas. At the onset of World War I he was selected with Prof. D. J. Demorst to build and operate a phosgene plant at the Edgewood Arsenal, serving as a major in the Chemical Warfare Service.

Alcoa had already recognized his potential and had appointed him director of research, a post he was unable to fill until war's end. Since then he has been the beacon of Alcoa research activity.

Dr. Frary's many attainments include the production for the first time of 99.99 pct pure aluminum by electrolytic refining and the production of pure alumina by electrotherman processes. He holds some 30 United States patents.

As a boy he copperplated the key to his home's kitchen door. As a high school sophomore he delved into photography and emerged with improvements on published formulas. Even then he was alert for new possibilities.

FORD BALLANTYNE, JR., was made vice-president, Wyandotte Chemicals Corp.

ROBERT WIER, JR., elected vice-president, brush division sales, Osborn Mfg. Co.

A. B. PARNALL, elected vice-president, manufacturing, Osborn Mfg. Co.

W. M. Costley was put in charge of a territory comprising Minnesota, Wisconsin, northern Illinois, Iowa, eastern Nebraska, North and South Dakota and eastern Montana for the HYSTER CO. **Dan Stearns** will handle sales in Pennsylvania, New Jersey, Virginia, West Virginia and the District of Columbia.

E. Neil Crosier and **Thomas J. Moore, Jr.,** were elected directors of the BRAINARD STEEL CO., Warren, Ohio, a subsidiary of the SHARON STEEL CORP. Named as officers were **E. T. Sproull,** president; **Thomas J. Moore, Jr.,** vice-president and general manager; **William J. Keegan,** secretary and treasurer; and **Ralph H. Glosser,** assistant secretary and treasurer.

Henry W. Luetkemeyer, chief engineer, was elected vice-president, engineering, and **Merrill A. Young,** personnel director, was elected vice-president, personnel, of the CLEVELAND GRAPHITE BRONZE CO. Named as a new director was **Robert H. Daisley,** vice-president and director of manufacturing of EATON MFG. CO.

Waldo E. McNaught became chief of BUICK MOTOR DIV. public relations on Apr. 1. Mr. McNaught has been a member of the staff of a Detroit newspaper for the past 13 years. He has also served as a lecturer in journalism at the University of Michigan.

H. Walter Regensburger has been appointed chief engineer of the general engineering department to succeed **Harry L. Strube** of LINK-BELT CO., Chicago. Assisting Mr. Regensburger will be **Charles M. Young, Jr.,** chief development engineer, and **Harold F. Watson,** chief standards engineer.

William P. Gillespie, manager of the market requirements department, HENRY DISSTON & SONS, INC., Philadelphia, has been named manager of chain saw sales.

George H. Deike, Jr., chief engineer and secretary of MINE SAFETY APPLIANCES CO., Pittsburgh, has been elected a director of the company.

Wallace W. Mojden is now associated as sales engineer with MILLS-WINFIELD CO., Chicago.

Hal Babbitt, director of public relations of KAISER-FRAZER CORP., has been elected a vice-president.

C. Heamon Castle was elected to the position of vice-president of the ROTO-FINISH CO., Kalamazoo, Mich.

John M. Stevenson has joined the YOUNGSTOWN SHEET & TUBE CO. as a development engineer in its mill research and development department. For the present, Mr. Stevenson will be located in the company's Tulsa, Okla., office, but later will be located in Dallas.

Otho V. Tally takes over as manager of ALLIS-CHALMERS' midwest region succeeding **Benjamin F. Bilsland,** who is retiring July 1 after more than 30 years of service. Mr. Tally, whose headquarters are in Chicago, was formerly manager of the St. Louis district. He is succeeded there by **Baldwin G. Witty.**

J. T. Williamson was appointed to the newly created post of central division sales manager for the CORY CORP., Chicago.

OBITUARIES

Francis Marion Taylor, 54, chief engineer of the Birmingham Slag Co. and president of the Drummond Trucking Corp., Birmingham, died Mar. 25.

Leslie M. Gumm, consulting sales engineer and former manager of steel mill and metal working sales for Westinghouse Electric Corp., passed away on Apr. 19.

Wynn F. Rossiter, assistant to the vice-president, Carpenter Steel Co., died on Apr. 24.

Roy E. Coyle, 63, automotive engineer, died recently at South Bend, Ind. He had served as chief engineer for Studebaker since 1930.

George Alfred Yost, former president of Lucas Machine Tool Co., died on Apr. 19 at the age of 71.

James M. Barton, former chairman of the board of directors and president of the Fretz-Moon Tube Co., Inc., died on Apr. 14.

Henry B. Sawyer, retired vice-president and treasurer of Stone & Webster, died in Wellesley, Mass., on Apr. 13.

Herbert A. Forsberg, vice-president and sales manager, Geuder, Paeschke & Frey Co., died on Apr. 3.

Charles B. Chisholm died on Apr. 19. He was sales manager of Pressed & Welded Steel Products Co., Inc.

L. Harold Coffin, formerly of the American & National Radiator Companies, and owner of the New England Pipe & Supply Co., Charlestown, Mass., died on Apr. 15.

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HIGH-TENSILE STEEL

SEVEN STRONG REASONS explain the trend to N-A-X HIGH-TENSILE steel for:

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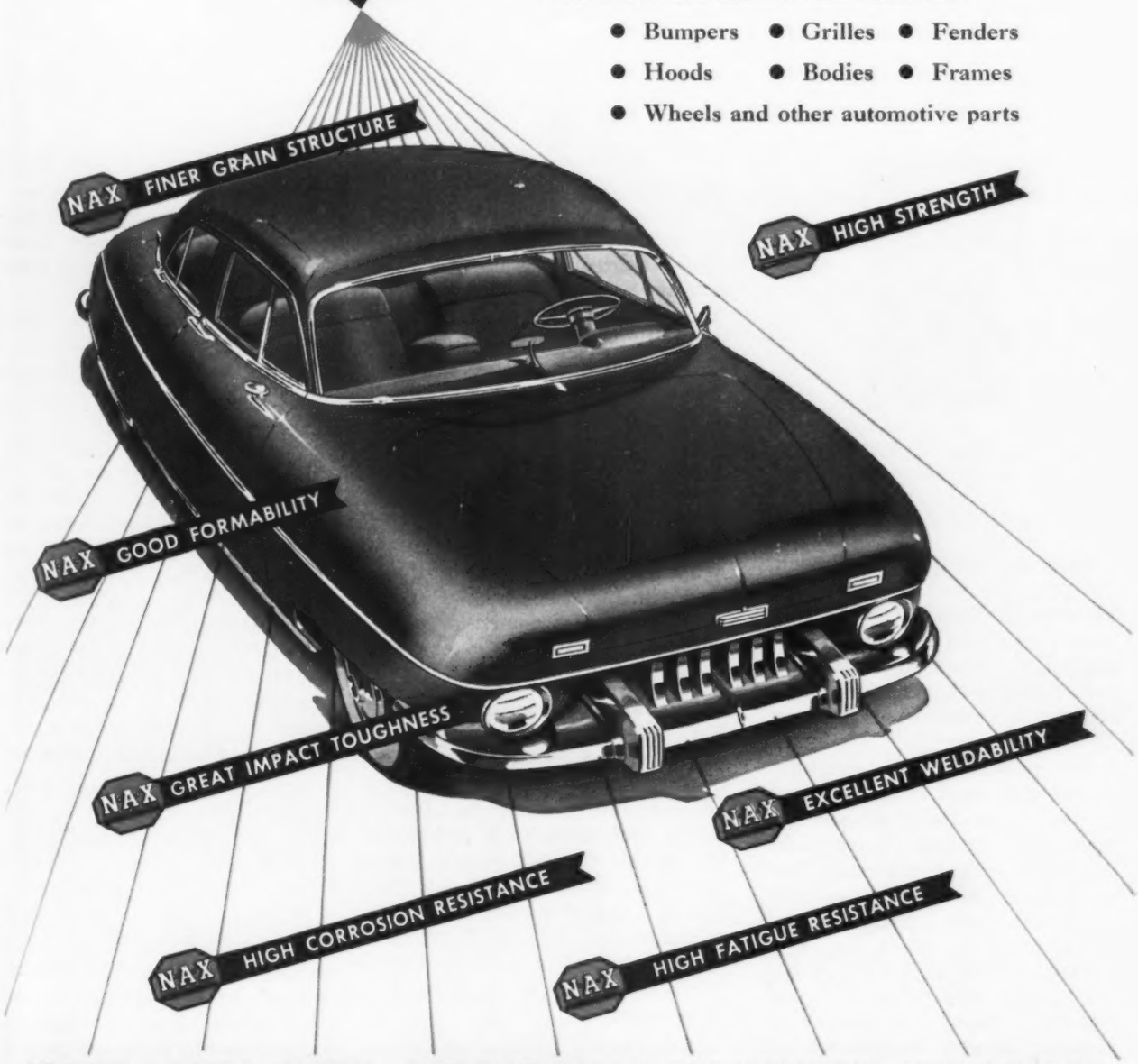
- Fenders
- Hoods
- Bodies
- Frames
- Wheels and other automotive parts



GREAT LAKES STEEL CORPORATION N-A-X ALLOY DIVISION • ECORSE, DETROIT 29, MICH. • UNIT OF NATIONAL STEEL CORPORATION

On the ASSEMBLY LINE

AUTOMOTIVE NEWS AND OPINIONS

Buying pressure may delay model changes . . . Kaiser-Frazer die cast inner doors start something . . . Chrysler lay-off hits office workers . . . Trend swings to lower price cars.

By WALTER G. PATTON

Keep the Old?—Will the auto industry love its 1950 models in December as it did in May? Will today's record-smashing auto production and excellent sales prospects influence the schedule of 1951 new model introductions now set for late this year?

One prominent auto executive figures that most of the evidence is now on the side of *delayed* new model introductions. Some model debuts will undoubtedly come about as planned. A big question mark surrounds Ford, Chevrolet and Plymouth plans. Each car is in tremendous demand. Auto officials are keeping mum but past history has shown there is always a considerable amount of *executive resistance* to a model change when sales are soaring.

Steel Men Note—Steel suppliers and metal fabricators should give their attention to what is happening to automobile doors. Kaiser-Frazer started something about a year ago with a die cast inner door frame over which a steel sheet is hemmed (IRON AGE, July 21, 1949). These doors are now on trial in customers' hands. The cost is low since aluminum is substituted for zinc.

Last week Clay Bedford, K-F executive vice-president, told the Detroit Chapter of American Society of Tool Engineers more about K-F's door development. He said that with increasing cost of sheet steel and labor the method would establish itself for automobile doors.

Aluminum Growing — Recently, Nash introduced aluminum extruded shapes for upper doors. Mr. Bedford also indicated that several advancements in presses and fabricating techniques have paralleled the die cast door development. No weight is saved, he said, but the ease of installation of new die cast moldings, their positive shape, and the neat finished appearance at the joints, gives this construction many advantages.

New Plating Process—Bedford also disclosed the new plating process worked out by Kaiser Aluminum which indicates that in the near future plated garnish moldings will also be lower in price using die cast aluminum rather than plated stamped steel or plated die cast zinc.

The new moldings are being made on five 48 in. Doehler-Jarvis cold chamber die casting machines at the rate of 100 per hr. Pouring temperature is 1260°F. Injection pressure is 2500 psi. Combination milling and checking fixtures are used in fabrication. These machines check the part and do the undercutting of the molding lugs at the same time they poke the flash out of the door lock button hole. Moldings weigh 3.22 lb for the two front door moldings and 3.16 lb for each of the rear door moldings. Dies for the job weigh 13,000 lb. The dies contain automatic, self-lubricating ejector pins.

Still Growing—One reason automatic transmissions are going to continue to grow in popularity is this: The motorist is not going to be able to forget about them.

Most drivers are slow to change over to automatic shifting. As for the change, the average driver is inclined to be enthusiastic. Another reason: Every manufacturer has prominently identified his automatic transmission. Identification is there on the rear of the car just

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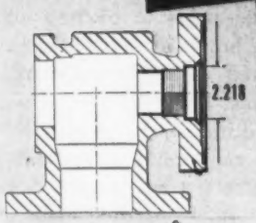

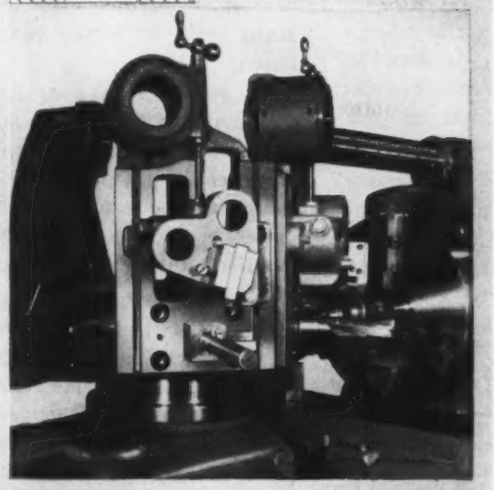

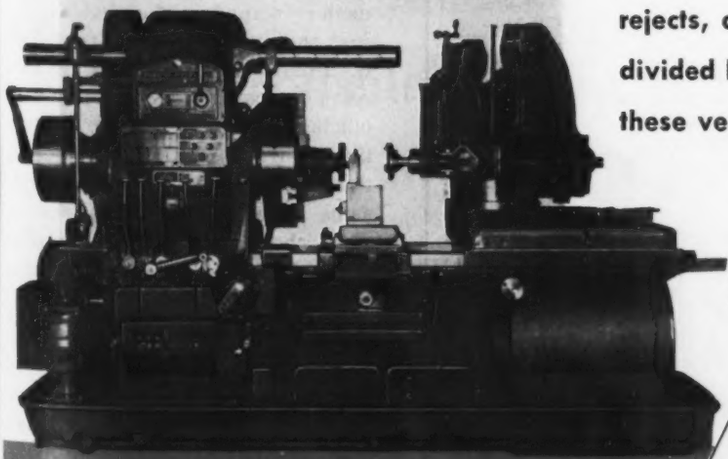

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ahead of you where you can't miss it — "Hydra-Matic"; "Dynaflow"; "Ultramatic"; "Powerglide." No wonder the motoring public is becoming increasingly aware of automatic transmissions!

Write It on the Wall—The introduction time table is not set. So don't write this on your calendar, but you can write it prominently on the wall as something that is sure to come.

(1) There will be less machining per car in the future, (2) Any machining that is done will be done faster. Here's why:

The use of permanent mold started a trend to casting-to-shape. Production engineers' appetites have been whetted by developments in die castings, powdered metal and precision castings. The best, however, is still to come. An example recently disclosed is a part now in pilot production in which 80 pct of the machining has been eliminated.

Faster Cuts—Lighter cuts and faster cuts are already here. A few years ago cutting steel at the rate of 200-300 sfpm was tops. Today the cutting rate for steel in several auto plants is more than 1000 sfpm. Experts at work on the problem think this rate may someday be doubled—conceivably it could be tripled in some instances.

More High Compression—The new high compression engines at Ford and Chrysler are making good headway but both programs have run headlong into a log-jammed machine tool industry. Ford is ordering tools for its six to be built at Cleveland and for the 8 which is set for the Rouge. Quotes for the new Lincoln and Mercury have been requested. It now appears that the first of the new Ford engines will hardly reach volume production before January. Chrysler, hamstrung by the strike, seems at present to be lagging somewhat behind the Ford tooling schedule. However, an early end to the Chrysler strike could see this program pop wide open.

Strike Effects—You can measure the depth of the Chrysler strike by the fact that many office workers have already been laid off. The office layoff is the first in Chrysler history. The number of white collar workers temporarily separated from Chrysler payrolls is not definitely known but is believed to be in the thousands. Total Chrysler employes idled by the strike hit 89,000.

Near a Record—As this is written, the Chrysler strike lacks only 20 days of equalling the record-breaking GM 113-day strike of 1946. Reports of new offers and new hopes of settlement have been raised so often Detroit hardly raises an eyebrow when a new headline appears in the Detroit papers. A 100-day strike is bound to affect a lot of people. Some will be bitter against the company. Many will be bitter against the union.

"A long strike does something indescribable to you," a labor veteran told THE IRON AGE this week. "You can't pin it down but it's there just the same. The effect will linger in the shop for weeks and months afterwards," he warned.

Small Car Paradox—Small car enthusiasts will have to ponder this fact—a fact that invariably starts the marketing experts tearing out their hair. Chevrolet *deluxe* models are outselling the *cheaper standard* models by 3 to 1. Is it the price, dealer emphasis, availability or just the insatiable appetite of John Q. Public for a fine motor car? Auto company executives won't say officially but many believe the public's desire to own a fine big car is the biggest single factor. At the same time, Polk registrations for 1950 show a trend to *low price* cars. Now just where was it that we came in?

Buys Building — Fisher Body Corp. is expanding in the Grand Rapids Area. Fisher recently announced acquisition of a building now owned by Haskelite Mfg. Corp. The building will be used by Fisher to expand its "cut and sew" department. The buiding contains 290,000 sq ft.

Several weeks ago Fisher added 189,000 sq ft to its stamping facilities in the Grand Rapids area.

THE BULL OF THE WOODS — By J. R. Williams

OH, I DON'T MIND, WHEN YOU'RE IN A TIGHT SPOT--
I HATE TO TAKE YOU OFF YOUR GOOD JOB AND PUT YOU CLIMBIN' AROUND CONSTRUCTION WORK AGAIN, BUT THEY'RE NOT GETTIN' TH' JOB DONE!
THAT'S LIKE PUTTIN' A FAT, SOFT ENGINEER BACK FIRIN' WHEN WORK GITS SLACK-- AN' TH' BULL SENSES IT'S A DIRTY TRICK!
YEH, IT KILLS 'EM OFF! THEY'D BE SHOCKED IF YOU PLAYED FOOTBALL AT SEVENTY. BUT THEY DO THAT TO YOU!
5-5 J.R.WILLIAMS
THE OLD GRADUATE
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OVER 50 YEARS OF FORGING PRODUCTION EXPERIENCE

WEST COAST PROGRESS REPORT

Digest of Far West Industrial Activity By R. T. REINHARDT

Stock Issue?—Evidence points to Kaiser Steel's eyeing public financing. No statements yet by company officials but a firm of business consultants has completed analysis of operations at Fontana plant and display advertising appears in publications reaching deep into the money marts.

Less Disadvantage — Far western industrialists still carry an extra wage burden approximately 15 pct higher than their eastern colleagues according to H. M. Doudy, head of the division of wage statistics, U. S. Department of Labor. Wage differentials for comparable work were about 30 pct higher in this area than in the Northeast or Midwest in 1907 and now have been cut approximately 50 pct.

Needs Some Limit—High cost of government and the trend toward a socialistic state are two of the principal "road-blocks" to growth of the West according to Thomas J. Bannan, president of Pacific Gear & Tool Works and Western Steel Works of Seattle and Los Angeles. He urges businessmen to avoid special privileges; adopt the Hoover Report; and urge control of the government closer to the states and counties.

Aluminum Profits — Aluminum foil is being produced at Kaiser Aluminum & Chemical Corp.'s Permanente, Calif. plant at 80 pct of capacity, approximately 400,000 to 600,000 lbs per month. D. A. Rhoades, vice-president and general manager, last week reported that all aluminum operations of his company would probably show earnings of 14 pct of sales at the end of the fiscal year, May 31st. Two other aluminum producers reported '49 earnings as 7 pct and 4.2 pct. Operations at the foil plant are being diversified to include lamination, embossing and coloring.

Import Steel — Imported steel has not as yet become a serious competitive factor on the West Coast, according to both consumers and importers, Estimates of volume now coming into Pacific Coast ports range from less than 1 pct to not more than 2 pct of consumption. Delivered prices of imported steel remain inviting, generally running 20 pct below domestic prices for bars, wire products, and small shapes.

One importer was recently offering ¼-in. rounds in minimum lots of 500 tons and maximum of 10,000 tons per month at a little better than 20 pct below current market.

Pipe Dream — Politics and finances will probably delay construction of proposed $100 million gas pipe line from Alberta into the Pacific Northwest for about five years. Who will install the line, where pipe is to be purchased, and route are yet to be determined.

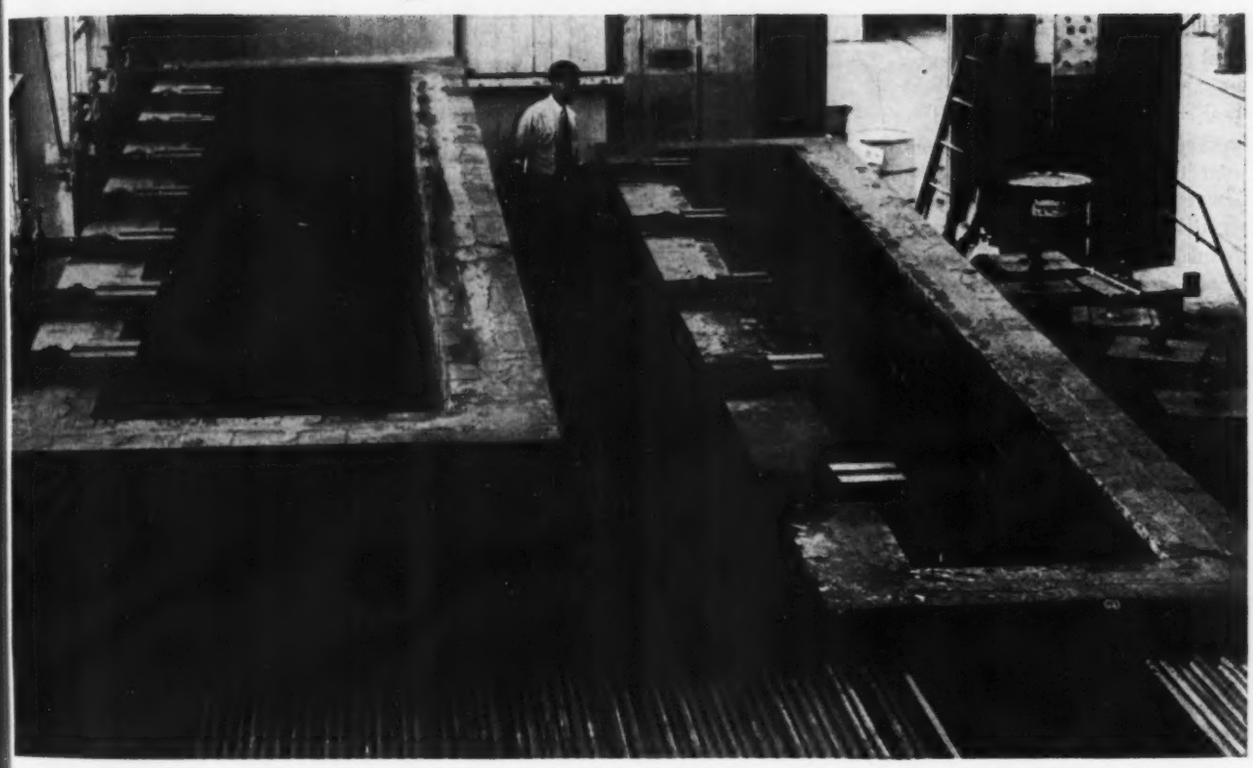
Firm Power — Pacific Gas & Electric Co. operates in 42 California counties and its generating capacity has been increased 1,156,400 hp since the end of the war. First of three generators at the Moss Landing, Calif. steam plant is now on the line. There has been more than a 50 pct increase in the installed capacity of the company's system since war's end. No power shortage in California is anticipated this year.

Seattle Mill Happier — Northwest Steel Rolling Mills in Seattle has started construction of a 440 x 85 ft warehouse to be completed in September to house fabricating facilities, merchant, and reinforcing stock. Equipment will include a 400-ft a minute, 7½ ton, double-hook crane; bending machines; shears for recutting fabricated work; and a laydown area.

Capacity of fabricating facilities will be doubled, elminating second shift in this department except for rush orders. The firm is once again operating its rolling mill on a five-day week though orders still are very limited. During the first three months of this year the mill operated only 41 days.

Powerful Pods—Boeing is studying addition of two auxiliary pod-mounted turbojet engines to its Stratocruiser transports to give luxury liners higher cruising speed and allow greater take-off weight. Pods would be installed outboard of present four piston-type engines. Engineers plan for the double-deck plane a cruising speed of 360 mph and gross take-off weight of between 153,000 and 165,000 lbs. Present gross weight is 142,500 lbs; cruising between 300 and 340 mph.

HOT ACID VS. "KARBATE" IMPERVIOUS GRAPHITE



WHEREVER metals are cleaned, plated or coated, "Karbate" impervious graphite equipment is an ideal material for cooling, conveying, pumping or storing the corrosive fluids involved.

"Karbate" pipe, fittings, valves, plate heaters, steam jets, pumps, tube-bundle heat exchangers, cascade coolers and related equipment are immune to attack by most commercial chemicals. This equipment is particularly well adapted to handling pickling solutions . . . Parkerizing and Bonderizing baths . . . nickel, copper, tin and zinc plating solutions . . . and the Alumilite and Alzek processes.

"National" carbon brick are the time-tested standby in handling nitric-hydrofluoric acid solutions . . . such as are used in the pickling tanks shown above. For complete information on both "Karbate" impervious graphite, and "National" carbon brick, write to NATIONAL CARBON DIVISION, Union Carbide and Carbon Corporation, Department IA.

These products sold in Canada by Canadian National Carbon Company, Ltd., Toronto 4

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THE FEDERAL VIEW

THIS WEEK IN WASHINGTON

By EUGENE J. HARDY

Steel Mills Stay Put—Despite Government agitation for new steel mills throughout the country, the Commerce Dept. feels major steel producing units will stay pretty much where they are. In mustering arguments for the St. Lawrence Seaway, Secretary Sawyer told Congress that even after Mesabi high-grade ores diminish by one-half, in about 20 years, the steel industry in the Great Lakes and Pittsburgh areas will still need 80 to 90 million tons of ore annually. Sawyer also said iron ore would now be the "most important" traffic on the Seaway. Before the Venezuelan discoveries, it was listed as only one of the major items of traffic. Now it is claimed that even if the Quebec-Labrador deposits do not fill the bill completely, the Seaway "would still permit the midwest steel industry to obtain open-pit ore at low transportation expense" from Venezuela.

Mobilization Snag—Canada feels that the major deterrent to a successful joint industrial mobilization program between the U. S. and Canada is the "Buy American" provision of U. S. laws. The reasoning, quite logical, is that each of the countries should make the military equipment it can best produce. Canada feels that in some lines its equipment is superior. The new "Northwest" all-weather fighter is a notable example. It cannot sell such equipment to U. S. military departments, because of the "Buy American" prohibition. In cases where Canada has developed superior armaments, production might be delayed unless sales can be made to other nations because it would be uneconomical to tool for mass production with only limited output in prospect.

"Buy American"—Any mention of repeal or modification of the "Buy American" laws raises Congressional fevers, notably in the mining States. Canada wants modification to help its defense program. While the State Dept. may be sympathetic to the Canadians, the situation will have to be handled carefully if anything is to be accomplished.

The fight for subsidies for nonferrous mines is an example. Such legislation was killed earlier in the Congressional session. But mining-state legislators are now proposing legislation to strengthen the "Buy American" statute. It would require the Munitions Board to buy strategic stockpile materials domestically unless they were absolutely unobtainable. The "Buy American" clause would seem to require this now, but President Truman has made it plain that he does not intend to follow it if it means a subsidy to U. S. producers.

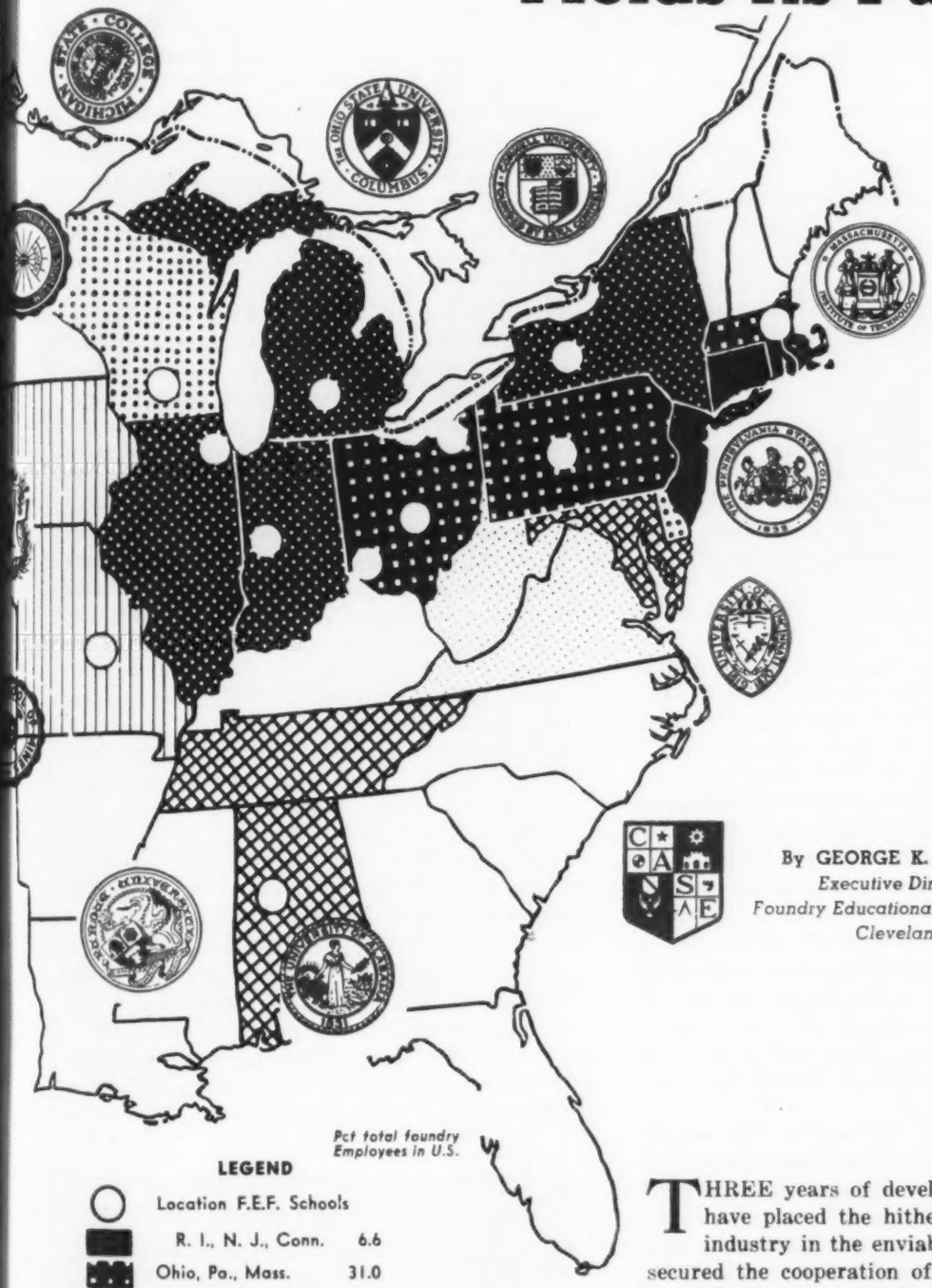
What Is an Employee?—Chances are better than even that Congress will retain present definition of "employee" in the Social Security Act. House passed legislation (H.R. 6000) extending social security benefits (and taxes) to millions of individuals now outside the law changes the classification of many "self-employed" people so that they would become employees of others.

Affected are large numbers of salesmen and other so-called independent contractors. Senate Finance Committee has already stricken House provision from the bill. This change would still make these individuals eligible for benefits, but they would be taxed as self-employed rather than employees.

Excess Profits Tax—Corporations would again be subject to an excess profits tax under legislation (H.R. 8169) introduced by Rep. Eberharter, D., Pa., a member of the tax-writing Ways and Means Committee. Proposal is designed to offset revenue losses from impending excise tax cuts. It is patterned after wartime law with more liberal exemptions and a maximum rate of 50 pct, in contrast with the wartime 95 pct. About 8 pct of the 300,000 corporations now filing tax returns would be affected. Its chances are none too good. The Ways and Means Committee will be more receptive to a straight boost of about 2 pct in the regular corporate tax rate.

Small Business—A move to channel more military buying to small business is gathering support in the House of Representatives. The idea is to divert not more than 20 pct of all armed services procurement to small business firms, irrespective of low bids. Two Massachusetts congressmen (Reps. Philbin, D., and Wigglesworth, R.) are trying to sell the proposal to the House Armed Services Committee.

The Foundry Industry Molds Its Future


Pct total foundry Employees in U.S.
LEGEND
Location F.E.F. Schools
R. I., N. J., Conn. 6.6
Ohio, Pa., Mass. 31.0
Ind., Mich., N. Y., Ill. 34.0
Wis., Del. 5.1
Tenn., Ala., Md. 6.3
Mo., Iowa 4.3
Cal., W. Va., Va. 4.8

By GEORGE K. DREHER
Executive Director,
Foundry Educational Foundation,
Cleveland

THREE years of development and progress have placed the hitherto sleeping foundry industry in the enviable position of having secured the cooperation of America's engineering colleges on a broad basis. This close liaison with universities has proved of value not only to the industry but to the universities as well. But most important of all, the young men who are graduating into a relatively new engineering field are hep to latest foundry techniques and developments. They are to some extent trained

Continued

The broad educational program started 3 years ago by F.E.F. is paying off. Participating universities have installed modern foundry facilities and their courses are producing graduates who know and appreciate the foundry industry. The industry is grabbing these men. The universities are benefiting and the casting industry, through this dynamic program, has shaken off its prewar lethargy.

personnel in modern foundry methods, a thing not experienced in the past.

The foundry industry for the previous 15 years made sporadic attempts to interest individual universities in certain phases of foundry operation. Friendliness was evident but no real progress was made until a broad program covering the entire castings industry blended into the technical and business economy of the nation was brought into being. In the light of present understanding this attitude on the part of the universities is readily understood. They simply cannot serve the self-contained interests of small groups and still maintain the essential character of and teach the fundamentals which equip young graduates with the mental flexibilities needed in our ever-changing economy.

The able leadership which inaugurated the Foundry Educational Foundation plan very wisely refrained from requesting highly specialized programs. It was believed that the essential subjects were in the present curriculums and that minor rearrangements would provide a proper series of studies for the end in view. Parallel with the development of the program there occurred a rebirth of engineering college interest in the broadening of the student's basic knowledge to include social studies and humanities. This reflected a trend among technical educators which had its inception prior to the war but which was necessarily deferred in the interests of rapid training for military purposes. As one of the purposes of the F.E.F. was to acquire candidates for managerial as well as technical positions, this trend literally joined hands with the goal of F.E.F.

The trend towards humanizing the engineer has borne fruit in the appearance of 5-year engineering curriculums such as those found at Cornell and Ohio State and the basic college at Michigan State. A further development is revealed in the new metallurgical curriculum at Case Institute of Technology where liberal elective time permits the student, after acquiring a thorough grounding of fundamentals, to follow the field in which his personality indicates a higher degree of probable success. This arrangement takes into account three general classifications of students: Those who want to make things, those who want to sell and distribute them, and those who are happiest in the discovery and why of new or old technology. This trend has been sponsored and promoted by the many technical societies and the founding members of the F.E.F. which include the Gray Iron Founders' Society, Malleable Founders' Society, Steel Founders' Society, Non-Ferrous Founders' Society, Foundry Equipment Manufacturers Assn. and the American Foundrymen's Society.

The presence of this trend and the warm reception by university officials greatly alleviated the task of the original members of the F.E.F. During 1946 and early 1947 visits were made by members of the industry to a number of universities. In most cases the essential courses were available to students. These included, in addition to social studies, specific subjects such as Industrial Relations, Cost Accounting, Production Planning, Methods Analyses, Industrial Organization, Market Analyses, Safety Engineering and others of specific value to administration careers. In the technical field most of the present subjects in metallurgical, mechanical and industrial engineering have direct bearing upon foundry and metals casting technology and no problem existed in this field except to develop, in some instances, a logical percentage of attention to cast metals and their production in existing courses.

Three essential problems remained. The first revolved around the necessary offering of the casting process to engineering students as a part of their fundamental engineering education in the various methods of creating metal products. In too many instances, the casting process was presented as a craft operation with little or no

F.E.F. OBJECTIVES

1. **To foster and improve education in the United States in the field of foundry engineering, practice and operation among colleges and universities.**
2. **To encourage and assist students in acquiring education and training in foundry engineering, practice and operation.**
3. **To develop adequate instruction to carry out these purposes.**

regard for desirable technical controls or the abilities of cast products made under the latter conditions. Improper housekeeping and crude laboratory methods reflected to the discredit of the process as an engineering method. Students in such laboratory work could not help but regard casting as a disappearing craft rather than a developing technology with untapped and untried technological possibilities.

While the transition is not complete the trend has been completely reversed through the direct interest and control of these laboratories by engineering professors and staff who have taken charge and are reorganizing the course material to incorporate modern technical controls while retaining enough of the craft ability to understand the essential hand operations. This understanding is a prerequisite, along with metallurgical methods and mechanical engineering ability in the mechanization of casting operations. Familiarity with the common casting metals such as

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Manager, Chicago Area Operations,
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Secretary-Treasurer—C. A. Barnett
President, Foundry Equipment Co., Cleveland

zinc, lead, aluminum, gray iron, malleable iron, steel and the heavy nonferrous metals is a function of this course along with reading knowledge of the different processes such as sand, permanent mold, die, centrifugal and investment casting.

The second problem involved the focusing of the student's engineering knowledge toward the casting process. This was especially desirable for those who were seeking careers in this industry. Most of the universities were not offering such study and it was necessary to plan this development to take place over a 2 or 3-year period. The general approach was to think in terms of a sequence of lecture and laboratory work through the senior year covering ferrous and nonferrous alloys plus foundry technology and methods. Such a course could not be complete but would serve to focus attention to and use of engineering ability in castings production.

Comparable courses exist in petroleum technology, machine design, textile processes, waterworks engineering, internal combustion engines, aeronautics, powder metallurgy, electrical machinery, illuminating engineering, ship design, ship operations, and a host of others in the professional elective group. At the end of the first 3 years these courses, and additional ones, have either been activated or are drafted. Being relatively new there is much room for development and improvement. Fortunately, men in charge at each university are pursuing this refinement and are moving much faster in this direction than even our own industry realizes or appreciates.

A third problem does not lend itself to such rapid solution and will require some time for proper development. This occurs in the field of casting design, specification and use. Virtually all engineering knowledge can be directed toward these phases of cast metals products. This knowledge is so vast that no one person could ever hope to achieve full coverage of the task. Actually, the design, specification and use of cast metals involves metallurgical, mechanical, electrical, chemical, civil, petroleum, sanitary, aeronautical, mining, ceramic, marine, architectural and even many more types of engineering knowledge. A frontal approach is not possible through sheer lack of such knowledge in the industry itself and the improper organization of the meager data available. It is one of the hopes of the industry that study and investigation in this field will gradually resolve the problem.

A benefit which was not anticipated at this early date exists in the several graduates who have elected to continue study for advanced degrees using casting problems as their thesis subject. Three such students anticipate receiving their doctorate in this manner during 1950.

These early contacts with universities were followed by formal corporation of the F.E.F. about March 1, 1947. While all levels of instruction were considered in the early discussions the program was finally confined to the university level alone. This policy has since proven sound. The present officers and trustees of the F.E.F. believe it is one of the main reasons for present successes. It has unified the entire castings industry for the first time on a common goal. The American Foundrymen's Society joined the discussions during 1946 and became one of the founding members. They were followed by the Foundry Equipment Manufacturers Assn., the Non-Ferrous Founders' Society and the formal unification with the Steel Founders' Society during the succeeding years.

Early discussions and visits to university campuses by the original officers of the F.E.F., president, Anthony Haswell, president, Dayton Malleable Iron Co.; vice-president, Peter E. Rentschler, president, Hamilton Foundry & Machine Co.; and the author, led to the formation of a basic set of policies and the assignment of funds for both equipment and scholarship purposes. Among these were: (1) Scholarship se-

lection and administration is in the hands of the university; (2) no formal contract was required of the student; (3) recipients must be citizens of the United States; (4) students were required to follow the program as set up at their university.

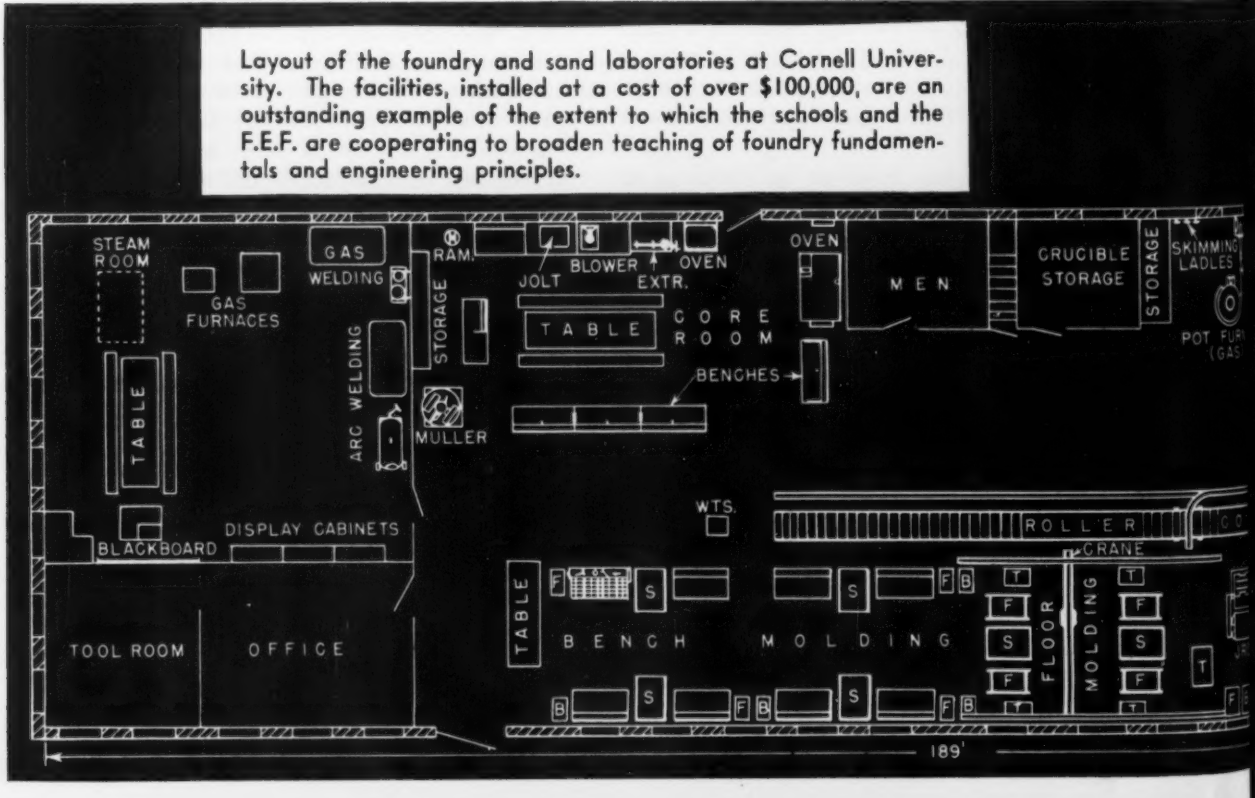
The trustees of the F.E.F. originally set up a 3-year cycle in order to give continuity over a development period. This was necessary as any shorter time would have the effect of a sporadic movement and could not command the cooperation of the university for the period which full development would require. One of the principal voids in the colleges was lack of proper laboratory facilities. Prior to this time no cause for such development existed. If the idea of engineering in foundry, cast products and production was to grow it necessarily must have some fertile soil in which to take root. Financial assistance for this purpose was therefore assigned to the five original colleges selected for the trial cycle, Massachusetts Institute of Technology, Cornell University, Case Institute of Technology, University of Cincinnati and University of Wisconsin.

In each case the university provided the space and building services as well as some of the required equipment. F.E.F. funds plus donations by alumni and other friends have provided the balance.

These laboratories are now either completed or in the final stages and are conducting research and development work for the castings industry at this time. They have become good examples for other universities in the development of their own program. The facilities in use at Cornell represent one of the most complete units installed to date. The F.E.F. feels that its work in this phase is accomplished and that other universities, by reason of service to their own supporting units and economy will have ample reason to assign funds for such purposes. Northwestern Technological Institute, Northwestern University, was added to the group in the early stages of the project and has plans for the development of its own facilities. Members of the foundry and castings industries in the South brought the University of Alabama into the group in 1948. For this purpose the University provided a new laboratory building which was equipped by funds and donations from friends of the University.

Concurrent with these developments three sets of committees came into being. These were appointed by Anthony Haswell as first president of the F.E.F. for an indeterminate time and they have been retained or supplemented by his successors, Peter E. Rentschler and Stowell Wasson, manager of Chicago area operations, National Malleable & Steel Castings Co.

The first of these committees were termed Industry Advisory Committees of which one is appointed for each university. Specific activities of these committees include assistance in arranging plant visits, sample castings for laboratory analysis and display, casting exhibits, lending or giving pattern equipment for student use, lending models and equipment. At Northwestern and the University of Cincinnati the committees have conducted meetings for high school students interested in college careers and especially the foundry industry. Meetings are usually held once or twice a year at which the university staff



Layout of the foundry and sand laboratories at Cornell University. The facilities, installed at a cost of over $100,000, are an outstanding example of the extent to which the schools and the F.E.F. are cooperating to broaden teaching of foundry fundamentals and engineering principles.

presents a summary of progress and development during the intervening months. Discussions and inspection of facilities help to give full acquaintance with the university. Committee members thus are in a position to pass on to the foundry industry some knowledge of the activity in each school and thereby help represent the university to the industry.

The second group to come into being brought together the technical representatives of the various branches of the foundry industry into a Technical Advisory Committee. This committee has become one of the main avenues of recommended technical procedure and source material to the universities. It also suggests methods to the industry to further the use and ability of engineering graduates within foundry organizations. Meetings are usually held in conjunction with the University Advisory Committee.

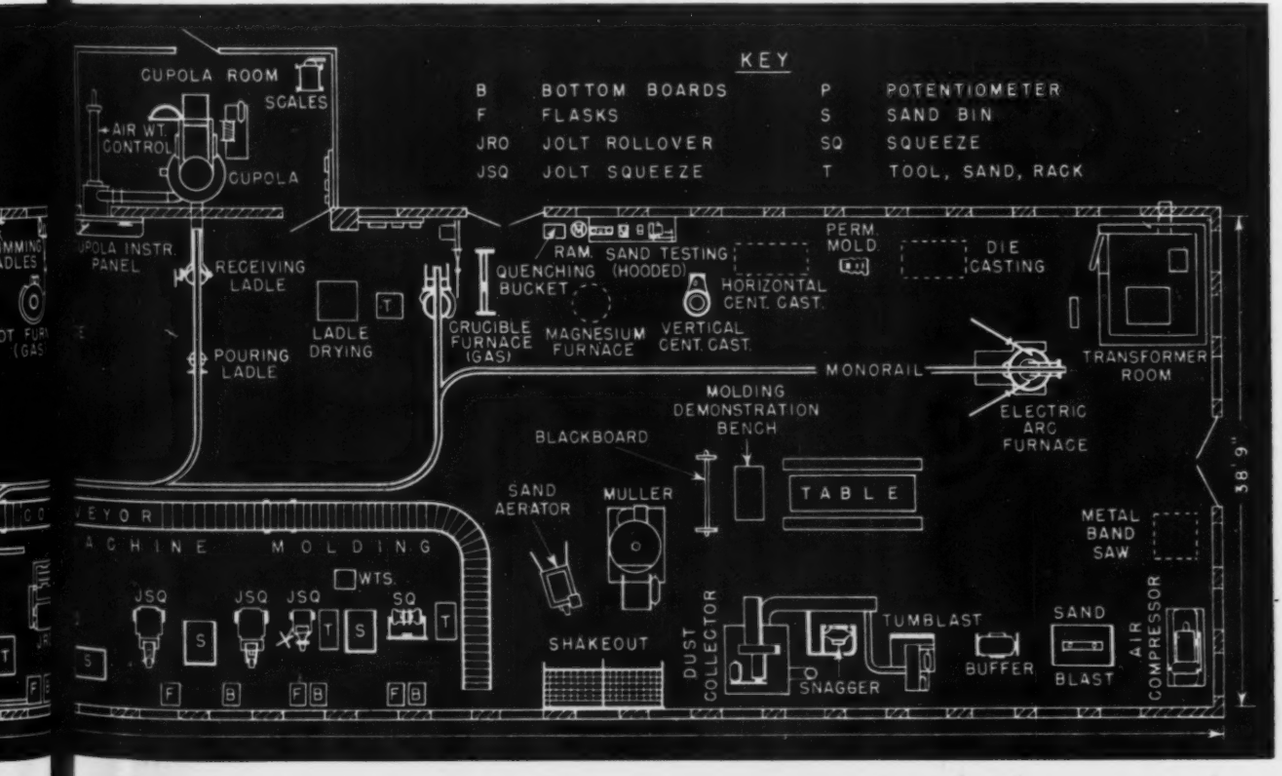
Subjects of recent discussion include improved definition of engineering management and how it applies to the foundry; the promotion of and problems connected with recruiting and training engineering graduates; student registration and contact procedure as practiced by the F.E.F.; summer work for students; recommendations as to progress and use of engineering graduates and their value to industry; definition and distinctions between trade and engineering education as applied to the foundry; proposed student handbook; technical accuracy as applied to the foundry process; casting design and use data; current technical developments in the foundry; association activities in the universities; research possibilities in university laboratories; and the problem of providing qualified instructors for secondary schools, colleges, universities, etc.

Each major group in the castings industry is included in this overall committee. C. W. Briggs represents the Steel Founders' Society of America, James H. Lansing the Malleable Founders' Society, A. W. Gregg the Foundry Equipment Manufacturers Assn., Walter W. Edens the Non-Ferrous Founders' Society, Everett G. Fahlman the Aluminum Foundry Div. of the Aluminum Assn. and Sil C. Massari the American Foundrymen's Society. George Johnstone, Jr., acted for the Gray Iron Founders' Society prior to the retaining of Charles O. Burgess.

The third group is composed of the key men in each university who form a University Advisory Committee. In the first 3-year cycle this group was made up of Prof. Howard F. Taylor, Massachusetts Institute of Technology, Prof. E. C. Wright, University of Alabama, Prof. R. H. Cole, Northwestern Technological Institute, Prof. G. J. Barker, University of Wisconsin, Prof. John F. Kahles, University of Cincinnati, Prof. K. H. Donaldson, Case Institute of Technology and Prof. Peter E. Kyle, Cornell University.

The Foundation's policy strongly acknowledges the fact that educational methods and procedures are best handled by educators and that final decisions in this field must rest with those authorities. The help and advice of these men has been constantly sought and is reflected in the policies and methods the F.E.F. follows. These men, meeting with the Technical Advisory Committee, establish a direct liaison with the various industry branches. This, in turn, permits a free flow of information and assistance in both directions, and many worthwhile recommendations have stemmed from this university group.

The Foundry Educational Foundation is an extension of the educational activities of its founding members and is devoted exclusively to



the university level. It serves the entire castings and allied industries including sand, centrifugal, permanent mold, investment and diecasting. The ultimate objective is to organize our effort so that the time will come when we are no longer necessary to the proper functioning of a continuous foundry educational program at the university level. We seek to use all existing facilities and abilities within the industry and universities and only accept such functions and activities which will leave no logical or convenient coverage from another direction.

UNIVERSITY COMMITTEES

Case Institute of Technology—W. L. Seelbach, chairman. C. A. Barnett. F. H. Wellman. B. H. Scott. Dr. B. E. Warden. M. W. Mauz. F. G. Steinebach. D. R. Hanna. G. E. Miller. W. B. Crawford.

Northwestern Technological Institute—L. J. Wise, chairman. H. Bronstein. G. W. Cannon. A. W. Gregg. L. C. Osborne. E. H. Reed. B. L. Simpson. S. Wasson.

Massachusetts Institute of Technology—H. A. Stockwell, chairman. G. J. Behrendt. A. Harrington. G. F. Hutchins. H. W. M. Saunders, Jr.

Cornell University—R. W. Crannell, chairman. W. C. Baird. G. S. Diamond. H. Garnsey, Jr. L. C. Gleason. R. Minnear. R. T. Rycroft.

University of Cincinnati—R. J. Redmond, chairman. H. Ewig. F. S. O'Neil. G. H. Tompkins.

University of Wisconsin—R. J. Anderson, chairman. W. R. Tanner. J. A. Gitsen. R. H. Weaver.

University of Alabama—J. T. MacKenzie, chairman. S. D. Manley. L. N. Shannon. G. P. Street.

Some of the intangible benefits of the program have been covered in the foregoing sections of this summary. The more tangible ones are more easily reported. Important among these is the reflection of professional interest in the form of textbooks suited to engineering study of the process. These books are all scheduled to be available within the forthcoming year and will mark the trend toward the engineering possibilities of this industry.

Members of the university advisory committees and their associates in the cooperating colleges have continually commended the summer student worker placement which has been a feature of the F.E.F. from the outset. The opportunity to gain a practical acquaintance with an industry helps the undergraduate student in determining whether or not it is a field to his liking. Beyond this he does establish a definite interest which is of value as a recommendation upon graduation. In many cases the summer worker has gone back to the same company. The number of students placed seem modest in comparison with the whole industry but a solid and healthy start has been effected. Sixty-seven placements were effected the first year, 1948, and 128 the second, 1949. It is believed that ultimately over 500 will be placed each summer. Many of these placements are made by simply assigning the student to a company sight unseen. The industry has been most cooperative in this regard.

Actual graduates placed in the industry totaled 42 in 1948 and 78 in 1949. Prospects are that over 100 will enter this year. The goal of the F.E.F. at the end of 10 years is to have 300 entering the industry annually and its activity is being gaged accordingly.

To provide candidates for these opportunities, programs are being inaugurated in the following departments of their respective universities as of September, 1950:

Industrial Engineering, Pennsylvania State College;

Industrial Engineering, Ohio State University;

Mechanical Engineering, Michigan State College;

General Engineering, Purdue University;

Metallurgical Engineering, Missouri School of Mines.

At this date the results of the F.E.F. effort are just beginning to be felt. The ultimate objective, rapid and intensive application of foundry engineering can't be adequately judged at present. Specific technical contributions have been reported by some of those young men. Others have been assigned supervisory responsibilities which they are discharging in an apt manner. Where the old-timers of the industry have taken the graduates under their wing, progress is noticeably rapid. More and more of the older men have found the willingness as well as the character of engineering graduates and are taking an active hand in developing assistants who not only have helpful engineering backgrounds, but a higher degree of reliability and responsibility as well.

Another 4 or 5 years may be required before the full impact of the program can be felt. In the meantime, developments in the castings industry are such that the successful use of them will depend upon greater technical ability and concurrent reductions in processing and end costs through engineering techniques.

Beyond the direct benefits to the castings industry there is a distinct contribution which a continually progressive development offers to the nation's economy and security. Casting is the only manner in which many refractory, temperature resisting and hot short alloys can be made into usable shapes.

INCO Writes Specs for Ductile Iron

To date, no standard specifications have been established as a basis for purchasing ductile iron. International Nickel suggests a set of specifications based on physical properties desired in various applications.

By **A. P. GAGNEBIN**
Research Metallurgist, International Nickel Co., Inc., New York

WITH increased production and growing popularity of ductile cast iron, there has been an increasing demand for specifications by large organizations who need some standards by which to purchase materials. Several grades of ductile iron have been produced to match various service requirements. International Nickel Co., Inc., has conducted an analysis of the general classifications of properties obtained in commercial production, and has set up a list of suggested specifications based on these properties.

Approximately 900 test results on 1-in. keel bars have been obtained from thirty foundries who have been producing ductile iron for some time. One category of ductile iron has developed the following properties in the as cast condition: yield strength 70 to 75,000 psi, tensile strength 95 to 105,000 psi, elongation 2.5 to 5.5 pct, hardness 225 to 265 Bhn. The matrix structure of this grade is substantially pearlite, although a small amount of ferrite may be present. With a ferritic-pearlitic matrix, a greater amount of ductility is achieved and the following properties are typical of this grade: yield strength 65 to 70,000 psi, tensile strength 85 to 95,000 psi, elongation 5.5 to 10.0 pct, hardness 195 to 225 Bhn. Both of these grades have been produced from cupola, air furnace, electric furnace, and crucible melted irons. The first grade has been used where maximum strength was desired and often where resistance to wear is a requirement. The second grade offers a compromise in strength and ductility and has greater toughness than the pearlitic grade.

With certain favorable base iron compositions, it is possible to obtain the following properties in the as cast condition: yield strength 55 to 62,000 psi, tensile strength 72 to 85,000 psi, elongation 9.0 to 15.0 pct, hardness 170 to 195 Bhn. Sources for this grade are more restricted than those for the two higher strength grades.

Any of these three grades can be annealed to produce fully ferritic structures in a few hours time, and under these circumstances develop the following range of properties: yield strength 50 to 60,000 psi, tensile strength 65 to 75,000 psi, elongation 17.0 to 23.0 pct, hardness 140 to 180 Bhn. The ferritic condition provides optimum machinability and maximum toughness.

SUGGESTED U. S. SPECIFICATIONS FOR DUCTILE IRON

Minimum Properties

Grade	Tensile Strength, psi	Yield Strength, psi	Elong., Pct
90-65-02	90,000	65,000	2.0
80-60-05	80,000	60,000	5.0
60-45-15	60,000	45,000	15.0
80-60-00	60,000	60,000	No Stipulation (By agreement with Producing Foundry)

Cast Specimen: One inch keel bar cast in dry sand.
Test Specimen: Standard round test specimen, ASTM E-8, with 2-in. gage length.
Yield Strength Measurement: 0.2 pct offset or by dividers method at 0.5 pct extension under load.

For applications requiring only high strength and stiffness, some irons have been melted which develop the following properties: yield strength 65 to 75,000 psi, tensile strength 85 to 95,000 psi, elongation 1.0 to 3.0 pct, hardness 230 to 290 Bhn. In contrast to the previous grades, this one contains a higher phosphorus level, which reduces its ductility and toughness. However, it has the same modulus of elasticity as the other grades and should be adequate for applications involving moderate shock but requiring high strength and stiffness.

The specifications shown in the table are suggested for the ferritic-pearlitic grades at the present time. Most of the INCO licensees have indicated that they are willing to accept orders based on these specifications.

ELECTRONICS Speed Core Drying

SAND core drying with conventional gas, oil or electric ovens has been a time-consuming bottleneck in foundry operations for many years. Other parts of the foundry have benefited greatly through mechanization and modernization, but gains have been somewhat limited by lack of progress in sand core drying techniques. This virtual standstill has also prevented conversion of foundry operations to production-line status.

Some progress has been made in the past decade toward improving core drying operations. This, however, has been confined to new plastic and other types of binders. Equipment and methods of drying have remained unchanged. Working conditions, too, have continued unimproved. Excess heat, fumes, dust and other safety and health hazards are still an inseparable part of today's foundry.

To improve methods and conditions, Allis-Chalmers electronic engineers and foundry technicians resorted to a dielectric heater and allied equipment to streamline sand core drying.

Conventional binders, such as linseed oil, were used in the initial experiments with dielectric heaters. Results were satisfactory from the standpoint of core quality, but little was gained in economy due to the high temperatures required by these binders.

Uses Dielectric Process

Dielectric heating is fundamentally the same as the "diathermy" treatments given by the medical profession for localized heating of parts of the human body.

Sand core processing employs the same principle, but the equipment differs, especially in capacity. Heat is developed in much the same manner, but the power output and the frequency of operation are much higher. The applicator assembly is actually a variable speed conveyer set up with an oven-type enclosure to house the electrode assembly connected to a dielectric heater as a source of power. The cores are taken out of the core boxes and placed directly on the conveyer, which carries them through the high frequency field between the two electrodes.

The rate of travel of the cores through the electrode assembly is determined by the power rating of the dielectric heater, the size of the core, the type of sand, the type and quantity of binder and catalyst and the moisture content of the sand. The core is heated uniformly throughout by the high frequency and brought up to baking temperature in a matter of seconds, or minutes at the most, depending upon the mass of the core and the power rating of the dielectric heater. A large proportion of the high frequency energy expended in baking a core serves to evaporate the moisture in the mix. The moisture content of the sand, therefore, should be closely controlled for the most efficient and economical operation.

Foundries presently using dielectric heating equipment are finding they can save considerable time and labor. Mulling or mixing time, for instance, is materially reduced when synthetic resin binders are used. Where a typical conventional mix using oil as a binder requires about 12 min of mulling, a mix for use in a dielectric heating unit using a resin binder requires less than 6 min.

There is also considerably less handling of the fragile green cores, which results in fewer rejects. In most foundries the coremaker must walk from his position at the core bench to the

TABLE I

SAND CORE COST COMPARISON

Method and Material	Material, Cost per lb*	Power, Cost per lb*	Cost per Ton, Total
Dielectric Drier			
Resin Binder No. 1	4.28	0.4	$ 9.36
Resin Binder No. 2	4.30	0.4	$ 9.40
Conveyer Type Oven, Oil Binder	4.09	1.7 (fuel)	$11.58
Rack Type Oven, Oil Binder	4.09	2.7 (fuel)	$13.58

* Except where otherwise indicated, cost is given in Mills.

Dielectric driers have been shown to produce better sand cores more economically. The entire atmosphere and appearance of the core room is changed by the successful application of eletronic equipment. The equipment is completely under pushbutton control from start to finish, and may be operated by anyone.

By JOHN DAWSON, *Electronics Engineer, Allis-Chalmers Mfg. Co., Milwaukee*

rack or tower oven with the green cores. This moving around can be eliminated with dielectric heating.

Cores baked in conventional ovens must be removed from the ovens and placed on racks for

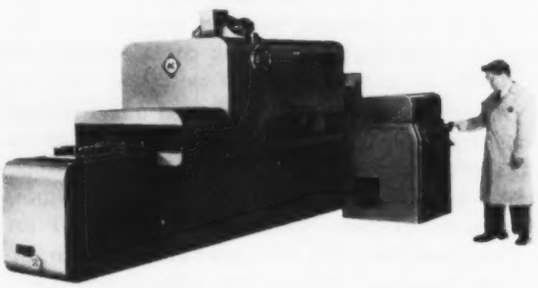


FIG. 1—Allis-Chalmers Model 250 dielectric sand core drier having an hourly production rating of 250 lb of sand at 3 pct moisture. It uses a 5-kw heater. Total floor space required is 64 sq ft.

cooling prior to inspection and ultimate use. As the baked cores emerge from the dielectric heating unit, however, they can be placed on a conveyer or carried directly to the pouring floor. In many cases, the cores are made at one end of the conveyer unit and poured on the other, thereby minimizing floor space.

The finish on the surfaces of cores baked in a dielectric unit is much finer and more uniform than on cores baked in conventional ovens using ordinary binders. It is also impossible to overbake cores by dielectric heat. The heating of the core is a function of the moisture, binder and other ingredients in the mix, and the type of sand. The high frequency power reacts to each of these materials in accordance with their power factors, which is actually an index of their electrical insulating properties.

If a mass of perfectly dry sand was placed in a high frequency field, it would heat very slowly since its power factor is very low. Dry sand consists of many particles that do not pack tightly together and each particle is actually surrounded by air, except for those few points where it contacts adjacent sand particles.

When water is combined with the binder and other ingredients in a core mix, however, the condition changes. The water combines with the binder and other ingredients to surround each particle of sand and fill up air spaces between particles. The purpose of mixing or mulling of the sand mix is to uniformly distribute the various ingredients and form a film that surrounds each particle. This film causes the sand particles to cling together to give good green strength before the core is baked and to give maximum ultimate strength to the finished core.

This film then makes dielectric heating possible, since it provides a low resistance path for the high frequency power and produces a condition called "selective heating." The power is rapidly absorbed by the film of moisture and binder. The moisture is evaporated and the binder is cured or set-up readily, while the sand is virtually unaffected. The temperature of the sand is raised, however, because of the heat conducted from the heated binder to the sand particles.

As the binder cures or sets up, its power factor becomes lower and lower and the power absorbed by the cores becomes less and less until the power or heat into the core finally just equals the heat losses from the core to the surrounding air. Thus it is impossible to overheat or overbake the core. There are no burned or overbaked regions to cause additional work in cleaning up finished castings. In general, cleaning and chipping are held to a minimum, if not completely eliminated. The cores emerge from the dielectric heating unit at a temperature of about 200°F.

The plastic binder offers definite advantages over conventional oil type binders in the shakeout operation. Conventional oil binders go through tarring and coking stages and then final reduction of the coke to volatiles and ash. If the heat is not sufficient to carry this process through its complete cycle, a hard mass results which must be mechanically broken up into

smaller particles to remove them from the core cavity. The synthetic resin binders go directly into a powder ash upon destructive distillation and the sand pours from the cavity dry, just as in its original state.

Some large foundries have been using plastic binders for their entire coring operations with 100 pct satisfaction. They find in this way they need fewer formulas or mixes for the overall production of the foundry. Standard mixes can be used for practically all cores, regardless of size or shape.

Shorter Baking Cycle

When using dielectric heating equipment, the baking cycle is materially shortened. This is in sharp contrast to the cycle using conventional ovens and oil binders, which can run for days. By reducing the baking time to a matter of seconds or minutes, it is possible to change production schedules almost immediately to meet the demand of the molding floor.

The conventional oven is usually oil or gas-fired; temperature must be maintained during the time that unit is not on production, including off shifts and weekends. The fuel demand also is nearly constant, regardless of the loading of the oven. This constant maintenance of temperature runs up fuel bills, in addition to reducing the life expectancy of the equipment and

FIG. 2—Heart of the dielectric core drying oven, showing a representative load passing under the electrode.

requiring constant attention. Dielectric heating equipment on the other hand, can be turned off during off periods. The start-up time consists of warming up the rectifier tubes, a time interval of about 30 sec.

After this warm-up time, the unit can be loaded immediately to its full output for production. Power requirements are determined by the amount of material between the electrodes and the moisture content of the mix. When the conveyer is running empty, the power expended

BENEFITS FROM DIELECTRIC METHOD

1. Core drying has been reduced to a matter of seconds or minutes.
2. Reduced handling, fewer rejects.
3. No cooling time before pouring.
4. "Packaged" units need considerably less space. Assembly-line conveyer system speeds up output.
5. Fewer workers, greater utilization of personnel.
6. Ovens need not be kept hot when not in use. They are ready for drying in 30 sec.
7. Finer, more uniform finish on cores than possible with conventional methods.
8. No wasted power. When core is dry, power is not absorbed, since it reacts to moisture. No overbaking or underbaking when assorted sizes are baked simultaneously.

between the electrodes and drawn from the service is at a minimum. There is no heat radiated into the room to increase the room ambient temperature and hamper working conditions. The heat is actually put into the cores where it is wanted.

A series of tests were conducted under normal operating conditions to get a comparison of the cost of producing sand cores by the conventional ovens and oil binders v. dielectric heating units and resin binders. Data given in Table I are taken from the tests and cover costs of two different resin binders and one core oil mix. These results are typical for all resin binders.

The initial cost of the dielectric installation may be higher than the conventional type oven, but this cost is offset by the lower operating costs and savings in handling.

Commercially available units developed for foundry use consist of the oven or conveyer assembly and the dielectric heating unit. The oven conveyer is made up in three sections fastened together. The infeed section has an idling roller, while the take-off section contains the motor for driving a variable speed reducer. This in turn drives the conveyer belt which passes through the oven assembly to carry the core between the electrodes. The belt is 36 in. wide and its speed can be regulated by the variable speed reducer from 5 to 18 ipm. An indicator on the speed reducer shows rate of travel of the belt.

The heating section or oven proper is the central portion of the complete assembly. The oven houses the 3x7 ft upper electrode assembly, which is suspended on an elevating mechanism. This provides adjustable spacing between the electrodes from 2 in. up to 13 in. so that cores from 1 to 12 in. in height can be processed. The upper electrode is connected to the high voltage source, the dielectric heater. This long electrode assembly is used to overcome one of the chief

objections to the use of dielectric heating units; namely, that it was impossible to heat cores of various size and configuration simultaneously.

The method of connecting the high voltage source and the location of the tuning element on this electrode determines voltage at the feed point. It also determines voltage rise from the feed point to the extremities of the electrode. Feeding the electrode near the entrance end where the wet sand enters the dielectric field, and tuning the electrode at this point, gives a very stable condition and provides a maximum

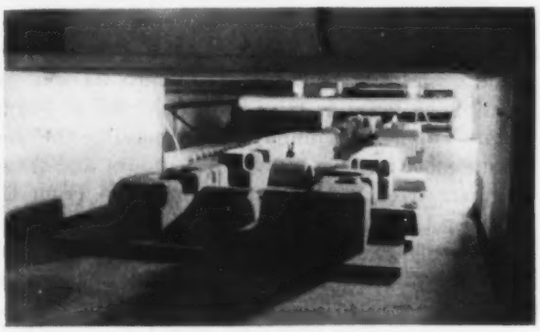


FIG. 3—Interior of the dielectric drying oven as seen from the discharge end. Electrode can be raised or lowered to positions varying from 2 to 13 in. above the feed belt.

of the available power being put into the core. The lower or ground electrode is stainless steel plate over which the conveyer belt passes. This stainless steel plate is actually the floor of the oven assembly.

The oven and electrode assembly is designed to operate in conjunction with either the 15- or 20-kw dielectric heaters or multiple units. The 15-kw unit will process approximately 650 lb of 3 pct moisture sand, and the 20-kw unit will dry approximately 850 lb per hr.

The quantity of sand processed per hour depends upon the size of the heater. Power is carried to the electrode assembly through a coaxial transmission line.

All doors on the heater and oven are interlocked so that if one is opened during the time the high voltage is applied, the high voltage is cut off and it is impossible to apply high voltage while it is open.

The 15- and 20-kw units use air-cooled tubes. This eliminates the problems usually encountered in bringing water into a heater and disposing of the waste water. It also eliminates condensation on the high voltage parts, which is always a source of trouble.

Several types of binders have been used in various foundries and each has its place in the field. Some work very well in steel foundries, others work better in malleable and gray iron. Actually, the compounding and the binders must be worked out in each case to provide the best results. Several have been used at Allis-Chalmers with various types of sand and were completely satisfactory.

Physical Limitations of Precision Castings

THE acceptance of precision casting as a solution to many design problems is attested by the rapid growth of this industry. There are, however, certain limitations which should be borne in mind during the preliminary stages of design thinking on parts to be produced by the process. The Microcast Div. of Austenal Laboratories, Inc., Chicago, points out that a great many products have exceeded normal limitations and in one or even all respects have been found practical from a production standpoint. The table showing these limitations can, however, generally be used as a working guide.

PHYSICAL LIMITATIONS AND TOLERANCES OF PRECISION CASTINGS

Design Factors in Selection of Parts

Min. weights, No. per lb	2000
Max. weight per casting	1
Longest dimension per casting, in.	8
Thinnest Continuous Section:	
Over limited area, in.	0.020
Over extensive area, in.	0.040
Thinnest edge on 20° angle, in.*	0.015

* On more obtuse angles, this thickness can be reduced.

The use of cores sometimes simplifies the problem of casting by their effect on section thickness. Depending upon the machinability of the alloy, round holes can often be drilled more economically than they can be cored. Especially is this true of straight, small holes. It is usually possible to obtain higher precision of hole size and location of hole if such holes are drilled rather than cast. It is possible to cast threaded parts; however, the casting procedure is not sufficiently accurate and does not produce smooth enough threads for most purposes. Austenal recommends that on surfaces requiring threads, the parts be cast oversize. A Class 1 fit is ordinarily best obtainable by casting and in most cases requires chasing.

New Gun Relines Cupola In One Hour

A wet refractory mix shot from a high velocity gun has reduced overall relining costs by more than 50 pct. No hand ramming is required. Any thickness coating up to 10 in. thick can be applied.

By **VICTOR E. HILLMAN**, *Director of Research, Crompton & Knowles Loom Works, Worcester*

IN most foundries, the cost of relining cupolas, after dumping following each 8-hr casting shift, constitutes a significant item because the labor required is expensive and so too are the refractories required. Until recently, relining was done in the conventional way by hand application and ramming of the patches.

In such work, patches of ganister and clay mixes more than 2 in. thick are not recommended and, as patches up to 12 in. thick are often needed, bricks had to be added. These cost 27.9¢ each and an average of 300 per day were needed in relining one of the two 60-in. No. 9½ Whiting cupolas that are used on alternate days. Average elapsed time for relining including chipping out slag, coke and oxide was 29 man-hr.

In seeking to reduce this cost, it was decided to experiment with a Bondact gun fed from a dry mixing device termed a Bondactor. Water, plus compressed air for atomizing it, are added at the gun along with the stream of refractories which is fed through a 2-in. hose 60 ft long by compressed air from the Bondactor. Identical equipment has long been used elsewhere for repairing concrete or applying layers thereof in construction work but using entirely different solids for this purpose than are needed in cupola lining.

By using this equipment, a wet stream of refractories is made to issue from the gun at high velocity and it is this velocity that packs or rams the refractories, as is required for a satisfactory cupola relining job. No hand ramming is required when the gun is used but it is necessary first to chip out the areas to be patched just as was done previously for hand ramming.

After the surface to be repaired is chipped, the gun is used to apply the necessary coating and it can be made of any desired thickness up to 10 in. or more where this is necessary to restore the surface to the desired contour. This is partly because of the high density produced by the impact, especially of coarse particles, and partly because the moisture content is controlled and kept low. In practice, an average thickness of about 6 in. is commonly necessary. The tuyeres are plugged while applying the refractory. It is a simple matter to build up any desired contour at this or other points as well as to fill such holes as may have occurred at burnouts. The new technique makes possible the use of the most modern design in contours and these in themselves reduce refractory costs from 20 to 40 pct.

The only hand work required in relining is to hold and direct the gun and to adjust the water flow by a cock to give the desired water in the mix. Adjustment is easily made because, if the mix is too dry, dust is formed and the ganister rebounds without sticking to the surface being repaired. If excess water is added, the application becomes too wet and runs. As either condition is instantly apparent to the operator, he immediately adjusts the water to the proper amount to provide the coating needed.

When first applied, the jet blasts the surface, most of the coarse ganister rebounding. This blasting insures good cohesion and is an insurance against the patch loosening and falling out, as it may do in a monolithic hand rammed job. In a few seconds, however, the wet clay starts to stick and then the ganister adheres and builds up. Each particle strikes at high velocity and rams those beneath. About 90 pct of the total sticks, and what rebounds is chiefly coarse ganister. That which falls below is collected

FIG. 1—Looking into the bottom of a cupola with operator holding the gun ready to start application of the patching grog on areas previously chipped.

and is reused so that there is practically no waste.

Because of the rebound of some of the ganister, the lining deposited contains a higher percentage of clay than in the mix being fed. Thus, when four parts of ganister to one of clay are fed, the lining deposited contains about three parts of ganister to one of clay, by volume.

While operating the gun, the operator stands on a scaffold, Fig. 1, and moves the gun by hand constantly so that coating is distributed and does not build up rapidly at one point. Atomized water not remaining in the mix is light and does not bother the operator who soon becomes used to working in a misty atmosphere. An ordinary drop light furnishes ample illumination.

Starting at the bottom, the operator works around the inner diameter of the cupola and upward until a height of about 3 feet is coated to desired thickness and contour. Then the gun is shut off, the scaffold is raised about 3 ft and a higher band is coated. The usual patching height is about 6 ft and it generally takes about a half hour to complete the patching.

Best Patching Mix

Different proportions of dry ingredients for patching have been tried but, to date, the best results have been secured with a 2:2:1, by volume, mixture of round coarse ganister, fine silica sand (or finely crushed ganister) and high quality clay. The dry mix now used contains:

40 pct amorphous silica, grade A (coarse)
40 pct amorphous silica, grade B (fine)
20 pct pulverized clay, No. 31

It is important to use a clay having maximum refractoriness and maximum plasticity. If of proper quality, clay can range from 15 to 25 pct of the dry mix.

Round Ohio ganister of +20 and —5/16-in. mesh is combined with either fine crushed ganister or fine pure silica sand for best results. Coarse ganister should not exceed 60 pct but is preferably held close to the 40 pct proportion.

As the gun delivers 100 lb of mix a min, the operator has to keep in close touch with the operator of the Bondactor which is in a separate room at the far end of the 60-ft hose. This he does by a pushbutton carried in a pocket and connected to a signal buzzer at the Bondactor. Air and water cocks are at the gun where the hose lines join the hose containing the dry grog.

The grog, prepared in advance, is stored in an overhead hopper like that used for supplying sand at molding machines. The grog falls from the hopper into the upper of two conical containers. When this container is filled, its cover is closed and compressed air is admitted. As soon as the pressure builds up, the passage to the second container, already under pressure, is opened and the charge is transferred to the lower cone. Then the connecting passage is closed and the upper container is opened and refilled. By using the two containers, some mix is always feeding into the supply hose as long as the machine runs. The two containers have rotating elements that keep the grog agitated and properly mixed. Consequently, the hose is kept filled with a uniform mix under air pressure of 75 psi.

Hydration takes place at the nozzle of the gun and tests have shown that the moisture content is held between 7 and 9 pct in the lining as deposited, or between 9 and 10 pct at the gun. For reasons already stated, if moisture varies outside these limits, the deposit either does not build up or runs and the operator has to adjust the gun accordingly.

The close control and low content of moisture are significant because they make for uniformity which is not attained in hand ramming. In the latter, moisture varies from 8 to 20 pct. If it runs, as it may, around 15 pct, there are 300 lbs of water to be evaporated per ton of lining and some 3200 gal of steam must be driven off for each cubic foot of wet mix applied. Formation of so much steam may loosen the lining.

The mixture applied by gun has resulted in a better lining and in a closer approach to uniform cupola performance. There is less burnout and, consequently, less material need be applied in patching. Because the gun operates with a uniform mix and a substantially constant velocity of mix is attained, the degree of ramming remains nearly constant as does the water content.

In this foundry, the cupola is dumped at the end of the day shift and cools ready for chipping the next morning. By about mid-day, the patching is complete and air drys over night, just as when hand patching was done. Fire is kindled early in the morning, further drying the patching just as before. The only difference in drying is that, as patching is completed more quickly, a somewhat longer air drying occurs.

When the foregoing facts are considered along with records which show that lining costs have been reduced by more than 50 pct, it is clear that substantial results have been secured. Investment in equipment is not large and the spaces needed for it is small. Savings attained will soon amortize the modest investment required.

ADVANTAGES OF THE GUN

1. Patching time is reduced to an average of about 60 min. including the well.
2. No bricks are needed whereas before about 300 per day costing 27.9¢ each were required.
3. Quality of patch is uniform and so improved by more than 50 pct.
4. Human variables that cause uncertain results in hand-rammed linings are virtually eliminated.
5. Some improvement in metallurgical control in cupola operation is attained.
6. Overall costs of relining have been reduced by more than 50 pct.

ADDED O_2 IMPROVES CUPOLA OUTPUT

by E. S. CLARK
Chief Engineer,
Meehanite Metal Corp.,
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Extensive studies show that oxygen enrichment of the cupola blast results in improved performance. Temperature at the spout was increased, less coke was needed per ton, and melting rate was increased. It was also noted that bridging was substantially decreased.

OVER a period of years, there has been constant interest in the possibility of using oxygen for enrichment of the cupola blast. Early references in the literature are to the work of the German experimentors. One recorded series of investigations showed an increase in melting rate of approximately 46.9 pct with a reduction in the use of coke from 7.95 pct to 6.77 pct. These are approximately 12:1 and 15:1 coke ratios. At the point where these maximum values were obtained, the blast had been enriched so that the oxygen content of the blast was changed from 20.9 pct to 23.71 pct.

An American investigator reported on a series of tests conducted in a 36-in. cupola in which enrichment of the blast by oxygen was varied from 0 to 13.8 pct of the total blast volume. In this series of tests it was found that in general, temperature was maintained more consistently at a higher level throughout the heat; there was an increase in melting rate amounting to 40.2 pct with the highest enrichment and that the apparent, or so-called, melting loss was reduced.

Generally, the reported data on oxygen heats have not given details of the quality of iron produced, nor the relative cost of such irons as were produced. The early experiments indicated that the use of oxygen at that time was not economical. Later experiments do not attempt to determine the economics of the situation, nor an economic point for the use of oxygen if one was present.

However, the data available show that melting rate was affected very considerably, that cupola melting loss was decreased, and that the temperature was brought to or maintained at a highly desirable point.

Modern technology has resulted in the possibility of producing oxygen at much lower cost than was previously possible. One of the difficulties of assessing the value of the use of oxygen to enrich the cupola blast is the efficiency of melting under normal conditions which to some degree determines the apparent value of oxygen use. It is quite possible that some of the results attributed to the use of oxygen in other experimental work could have been achieved by modification of the normal operations.

Research work pertaining to use of oxygen for enriching the blast was conducted, using a Meehanite Equiblast cupola, blast volume control instruments and the development of advantageous techniques for cupola operation. The changes in results which were recorded when oxygen was used can be said to have come from its use and could not have been secured by normal modifications of melting techniques.

The cupola used at Ross-Meehan Foundries,

Chattanooga, Tenn., is 48 in. lined diam and is mechanically charged. Oxygen was generated by a machine installed for this purpose and was pumped into standard bottles to a pressure of 2250 psi, which were arranged in a bank. From the storage bottles, a line of 1-in. diam copper tubing, 950 ft long, led to the measuring and control device, which consisted of a 1-in. diam orifice formed in a sheet of stainless steel. The orifice plate was inserted in a 4-in. pipe extending 40 in. upstream and downstream from the orifice plate.

Manometer taps were inserted 4 in. upstream and 2 in. downstream from the orifice plate and the quantity of oxygen flowing was controlled and measured by observation of the difference in pressure resulting from flow through the orifice. The flow was determined by observation of the temperature and pressure at the storage bottles every 15 or 30 min. Thus, the orifice was calibrated and the flow regulated to a desired amount.

From the downstream end of the pipe containing the orifice, 1-in. diam copper tubing extended to a point of entry into the blast main. The point of entry was approximately 5 ft from the windbox and the tubing was brazed into the blast main at an angle of 45°. Turbulence in the blast main and windbox was relied upon for mixing. No local effect was observed.

Prior to the use of oxygen in this foundry, the records of results over a considerable period were examined. Further, certain heats were run immediately prior to the use of oxygen to establish whether or not coke and blast as normally used could be advantageously modified and the same or better results obtained.

This practice of continually checking as to the advantageous base conditions was continued throughout the considerable period during which the use of oxygen was on a trial basis. During the first period of the work a base condition was established as being representative of normal.

Twenty-three heats were run, using oxygen. In general, some factor of operations was changed in each heat, but a few heats were run in which the conditions were duplicated in order that a check of results might be had.

No major difficulty was experienced during any of these heats, although analyses were not always those desired. However, it was the practice not to change charge make-up to correct analysis except that results indicated quite definitely that this was necessary. The results of these heats have been examined in detail and some of them have been selected as illustrative of the effect of the use of oxygen, as shown in Table I. Heat No. 13 represents the normal condition of operation with the normal coke and ferrous material available.

The production of satisfactory temperature throughout any heat using oxygen depends on proper balance of coke and oxygen. When oxygen has been used under comparable conditions the temperature at the spout has been increased. The temperature increase has been greater as the percentage of oxygen to total blast has been increased. Fig. 1 shows the temperature of metal at the spout during the six selected heats.

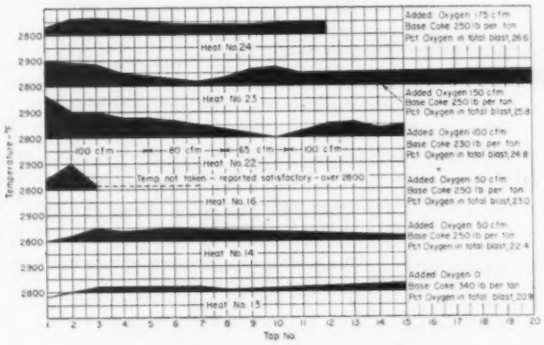


Fig. 1—Effect of oxygen addition to the blast on temperature of the metal at the spout for the six selected heats of Meehanite metal.

Relatively small oxygen additions or changes in the amount of oxygen serve to increase or change temperature.

The addition of oxygen to the blast may be a highly advantageous means of controlling the temperature of iron at the runway. Analysis of all of the data shows that while temperatures higher than those normally obtained at this plant were produced, this increase in temperature is not automatic for all conditions.

However, if the total oxygen remains the same after adjusting blast and adding oxygen, a rise of temperature may be expected.

The melting rate of a particular cupola can

TABLE I

SELECTED HEATS USED IN ANALYSIS OF COST

Heat No.	Blast, cfm	Oxygen Addition, cfm	Base Coke,* lb	Melting Rate, lb per hr	Pct Oxygen to Total Blast	Pct Added Oxygen to Total Blast
13	3500	0	170	13400	20.9	0
14	2900	50	125	13500	22.4	1.7
16	2400	50	125	13500	23.0	2.0
22	2000	100	115	12000	24.8	4.8
23	2350	150	125	15100	25.8	6.0
24	2250	175	125	15000	26.6	7.2

* Recarbonization coke added for each type of iron melted.

be safely raised by the use of oxygen in the blast. A few heats show increased melting rates of 11 pct as against what may be termed the normal value. This meant a shorter heat time in one case of 25 min for melting 54,000 lb and 19 min in the other for melting 44,000 lb. At this foundry, the melting rate of 15,000 lb per hr is approximately the maximum allowable due to limitations imposed by the rate at which it is possible to charge the cupola and distribute the iron.

The data available and this present work indicate that, with still higher use of oxygen, further

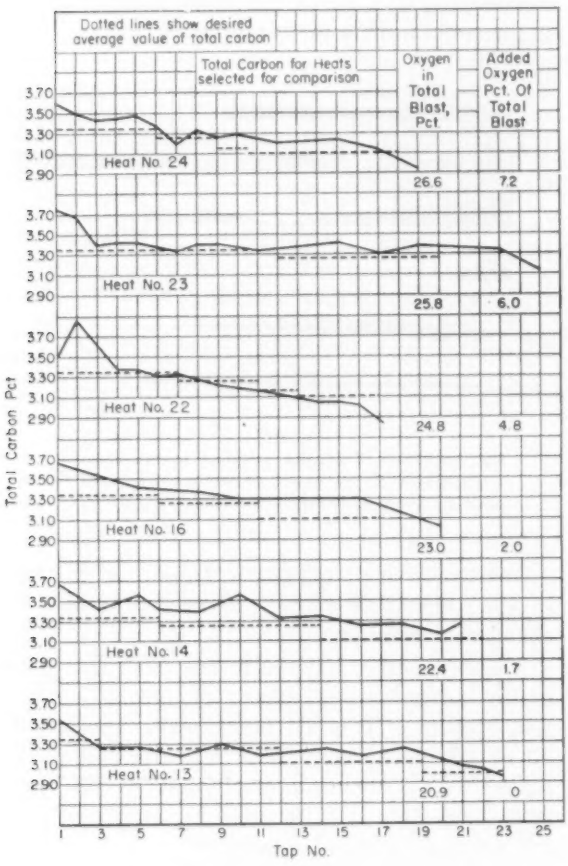
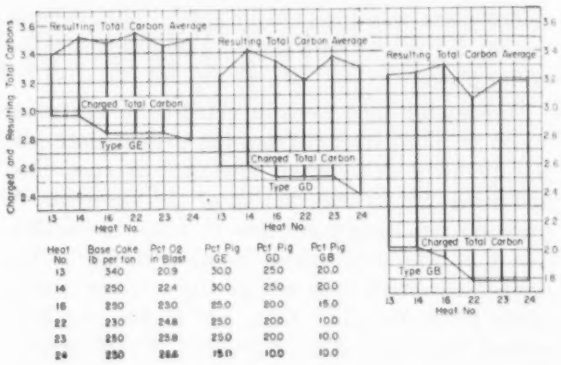


Fig. 2—Effect of oxygen addition on the total carbon. It was found that total carbon for the same mix could be raised by oxygen enrichment of the blast.

increase of melting rate might be obtained, but it does not follow that all items of operations are favorably affected nor that melting rate is affected in proportion to oxygen used, if other factors are kept under control.

In the Ross-Meehan plant, the use of added oxygen resulted in increased carbon pick-up. Change of charge make-up to control the total carbon value of the different types of charge was not made until the evidence was sufficient to warrant a change so that, during certain heats, the resulting total carbon was higher than desired. The total carbon values for the six selected heats are shown in Fig. 2.

The change in carbon pick-up is shown in Fig. 3 which shows the reduction of the charged total carbon value as well as the average resulting total carbon for each of the different types of metal.



Heat No.	Base Coke lb per ton	Pct O2 in Blast	Pct Pig GE	Pct Pig GD	Pct Pig GB
13	340	20.9	30.0	25.0	20.0
16	250	22.4	30.0	25.0	20.0
16	290	23.0	25.0	20.0	15.0
22	230	24.8	25.0	20.0	10.0
23	250	25.8	25.0	20.0	10.0
24	250	26.6	15.0	10.0	10.0

Fig. 3—Effect of oxygen addition to the blast on carbon pick-up in various types of Meehanite metal.

For a considerable period the tendency of total carbon values in this foundry had been to the low side. Recently, because of the difficulties in obtaining good quality coke, it has been the practice to use two types of coke in each split. These were mixed on the basis of one part high carbon to three parts low carbon coke. This coke mixture helped to raise the total carbon value and the mixture was continued during these heats.

The use of oxygen with appropriate blast to maintain or increase melting rate and temperature resulted in an increased carbon pick-up of from 0.1 to 0.2 pct. Carbon pick-up increased as the oxygen content of the blast was increased and was approximately the same for all types of metal involved. Compensation was made in this foundry by reduction in the pig content of the charges and with some adjustment of steel content, Fig. 3.

In general, the total carbon value showed no greater tendency than normal for variation in a particular type of charge during any heat except that at the very beginning and at the very end of the heat. Charge make-up should be adjusted for the first two charges to reduce total carbons.

With the use of higher oxygen contents and lower total blast values difficulty was experienced at the end of the last two taps, from undue silicon and manganese loss and low carbon pick-up. This is attributed particularly to poor blast distribution at this time. It was necessary to make sure of dropping at least two 1000-lb charges, or to cover the last charge with drop coke and reduce the total blast by cutting off the oxygen addition or reducing the blast, or both. With proper precautions the difficulty was eliminated.

It is very difficult to determine with exactness the effect of the use of oxygen added to the blast on silicon loss. Long continued examination of analyses of ingoing and resulting metal would be necessary to arrive at a definite result. On basis of examination of the results where conditions as to temperature and total carbon pick-up were favorable, the silicon loss appears to have been reduced. This was confirmed by the fact that the silicon charged was lowered somewhat for types GE-20 and GD-30 metals with resulting silicon values maintained, on the average.

Effect on Manganese

The effect of the use of oxygen as an addition to the blast is less well defined in the case of manganese than in the case of silicon. However, the data with respect to the six heats selected for comparison show some reduction in manganese loss for types GE-20 and GD-30.

For types GE-20 the loss was decreased on the average approximately 8 pct on a charged manganese content varying from 1.03 to 1.14 pct. For the type GD-30 metal the loss was decreased on the average approximately 5 pct on a charged manganese content varying from 1.16 to 1.20 pct. On the basis of the results of the six selected heats and from examination of all of the data there would not appear to be adequate basis for the assumption that charged manganese could be reduced when oxygen is used, although there is some trend indicated in that direction. Insufficient analyses for sulfur were available to form a definite conclusion.

Bridging was at one time a serious difficulty at this foundry, but had been ameliorated before the start of this investigation, so there was no indication that bridging or blocking of the tuyeres affected windbox pressure.

When oxygen was used, the amount of bridging and blocking was further reduced. The slag in front of the tuyeres formed a very open network perhaps 3 to 4 in. thick.

As the percentage of oxygen in the blast was increased, the temperature near the tuyeres appeared to increase. On one occasion, using 150 cfm addition to 2350 cfm blast, some of the tuyeres were burned off. Extending the eave to 4 in. instead of 1½ in. per side corrected the difficulty.

The burnout of the cupola lining has been observed and measured under normal heat conditions and when oxygen was added to the blast. There appears to have been no change in burnout which could be differentiated from normal variations. The distance above the tuyeres to the point of maximum burnout has not changed appreciably.

With oxygen additions of 100 cfm or more the drop has been very clean; almost no slag adhered to the walls. Preparation of the cupola has, therefore, been made easier although no change in standard time for this operation has been made.

During the course of this work, the tensile values have tended at times to be lower than normal for each of the types of metal produced. These lowered tensile values have been present when the silicon and total carbon values were high.

During the running of heat Nos. March 26 to 32, the heat analyses were restored to a more nearly normal basis for this foundry and the results show relatively high tensile strengths. The hardness values do not appear to be correspondingly high.

Table II compares properties of experimental oxygen heats, as determined for various conditions of operation during this period. Table III lists results obtained after it was established that 50 cfm oxygen would provide optimum results. Total carbon and silicon are indicated as within the normal range for this foundry or on the low or high side.

RESULTS OF OXYGEN IN BLAST

1. **Metal can be produced at higher temperature with proper blast modification.**
2. **Less coke is needed to melt a ton of iron.**
3. **Total carbons for the same mix may be raised.**
4. **Or modification of the mix is possible to secure the same total carbons.**
5. **Silicon loss is reduced.**
6. **Sulfur pick-up is reduced.**
7. **Melting rate may be increased without sacrifice of other favorable factors.**
8. **Tensile and transverse values appear to be maintained or somewhat increased when analysis is controlled to normal values.**
9. **Fluidity appears to be improved at least to the extent to which temperature is improved.**
10. **Oxygen can be used intermittently as a means of improving control.**
11. **Preparation of the cupola was not increased as to time required or difficulty.**
12. **Bridging was definitely decreased in density and extent.**

The cost of oxygen over a considerable period of time has remained relatively stable. It might appear that the great increase in use together with increased efficiency of production have offset to a large degree any tendency toward increased costs arising from increased cost of labor involved in its production and distribution and increase in equipment cost.

Oxygen is normally sold at 99.5 plus purity

but some of the large users in the steel producing field are generating at 95 pct purity.

Air Products Co. produce oxygen extracting equipment which is leased to the user and paid for on the basis of a charge per unit of oxygen used per month. To this charge must be added the labor cost of operation of the equipment plus any capital charges for housing and distribution.

Insofar as has been determined, the cost of oxygen does not vary materially whether it be centrally produced and distributed in containers or plant generated. The major variation in oxygen cost comes from the amount used per unit of time.

The graph, Fig. 4, shows roughly the cost of oxygen at 99.5 pct purity as used in any estimates of cost made in connection with this report. The cost of oxygen indicated by the graph is based on the charges which have been established in a particular instance, plus an estimate of labor charges whcih are believed to be reasonable but which under favorable conditions could be reduced.

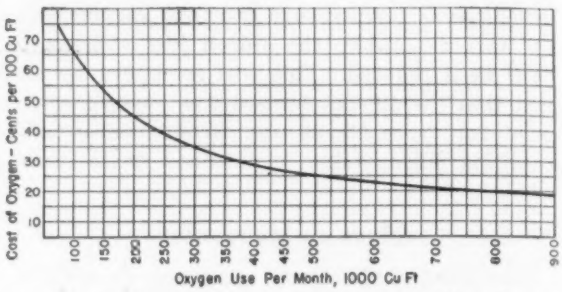


Fig. 4—Approximate cost of oxygen per 100 cu ft as determined during the investigation.

TABLE II

PROPERTIES OBTAINED WITH OXYGEN EXPERIMENTS

Type GB Meehanite

Heat No.	Tensile	Hardness, Bhn	Trans.*	Deflection	Total C	Si	Oxygen Used, cfm	Pct Oxygen in Total Blast
13	39200	207	2860	0.31	H	N	0	20.9
11	37300	207	2587	0.29	H	L	50	22.4
16	34600	217	2800	0.31	H	N	50	23.0
22	38700	207	2939	0.28	N	N	100	24.8
23	36900	196	2870	0.38	H	H	150	25.8
24	44000	207	2944	0.30	H	N	175	26.6

* Values from 1.2-in. diam bars centrally loaded on 12 in. span. L = Low side of normal. H = High side of normal. N = Normal.

TABLE III

PROPERTIES OBTAINED WITH ESTABLISHED OXYGEN VOLUME

Type GB Meehanite

Heat No.	Tensile	Hardness, Bhn	Trans.*	Deflection	Total C	Si	Oxygen Used, cfm	Pct Oxygen in Total Blast
26	43000	196	3140	0.33	N	N	50	22.6
27	43400	207	3087	0.31	N	N	50	22.6
28	46200	207	3754	0.43	N	N	50	22.4
29	45200	212	3342	0.35	N	N	50	22.4
30	50300	207	3710	0.42	L	N	50	22 4
31	55600	228	3645	0.33	N	N	50	22.4
32	49200	223	3944	0.40	N	N	50	22.4

* Values from 1.2-in. diam bars centrally loaded on 12 in. span. L = Low side of normal. H = High side of normal. N = Normal.

While this graph shows a continuous curve, the graph of cost should consist of a series of steps, since the charge is usually the same for some spread of oxygen use per month. The steps are usually in amounts of 50,000 or 100,000 cu ft per month.

NEW BOOKS

"Foundry Science," by H. A. Schwartz. The book describes in sequence the metallurgical operations of a foundry in such a manner as to demonstrate that the foundry industry is governed by fundamental scientific facts. Pitman Publishing Corp., 2 W. 45th St., New York 19. $6.50. 286 p.

"Isotopes—A Three-Year Summary of U. S. Distribution." The report measures the value of isotopes to peacetime research by listing more than 1850 publications on work done with products of the atomic energy program. Supt. of Documents, Govt. Printing Office, Washington 25. 45¢.

HOW TO USE SEACOAL IN MOLDING SANDS

Proper blending of seacoal with facing sand improves the surface of castings. Ash, sulfur content and moisture in the seacoal must be low. The most significant part played by seacoal is its gas-forming characteristic which when handled correctly is a valuable tool to the foundryman.

By H. L. CAMPBELL
Metallurgical Engineer, Oak Park, Ill.

SEACOAL is the finely ground bituminous coal which is used in the sand mixtures for making molds for iron castings. When molten iron comes in contact with the mold surfaces containing seacoal a gaseous atmosphere is generated which resists the fusing of the sand to the metal. Thus the seacoal produces a condition which favors the peeling of the sand from iron castings. Seacoal in molding sand mixtures also lowers the expansion of the sand when it is exposed to high temperatures in a mold.

The destruction of the seacoal by heat counteracts to some extent the expansion of the silica grains in the sand. Furthermore, the distillation of the constituents in the seacoal results in the formation of tar which cements the sand grains together in the face of the mold.

Molding sands contain grains of silica in the form of aluminum silicates, which are highly refractory and bonding substances. They also contain iron oxide which is less refractory. If the facing sand contains seacoal in sufficient quantity, the products from the distillation of the seacoal are deposited on and circulate about the sand grains, thus retarding the fusion of the sand and preventing its adherence to the castings. When molten metal enters a green sand mold, the heat radiated from the advancing metal first causes the evaporation of the moisture from the sand and then the distillation of the volatile matter from the seacoal in all exposed surfaces. After the oxygen in the mold cavity has been consumed by combustion, the gases from the seacoal form a carbon deposit on the inner surfaces of the mold. This carbon coating serves as a preliminary protection to the sand. As the heat penetrates deeper into the face of the mold, more seacoal is decomposed, thus building up a gas pressure between the metal and the face of the mold. This gas cushion, although it may be effective for a short period because of the permeability of the mold, prevents the sand from fusing to the casting.

Another beneficial effect of the seacoal is the fact that the heat required for its decomposition is taken from the metal. This causes a lowering of the temperature of the metal, thus reducing its activity in fusing the sand.

As a rule, the coal used in the preparation of seacoal has a high volatile, low ash, and low sulfur content. The volatile matter usually ranges from 30 to 35 pct, the fixed carbon from 56 to 65 pct, the ash content from 3 to 5 pct, and the sulfur less than 1 pct. The specifications in the table are proposed for the composition of seacoal.

PROPOSED SPECIFICATIONS

Seacoal

Volatile matter	30 pct min
Fixed carbon	50 pct min
Ash	8 pct max
Sulfur	1 pct max
Moisture	5 pct max

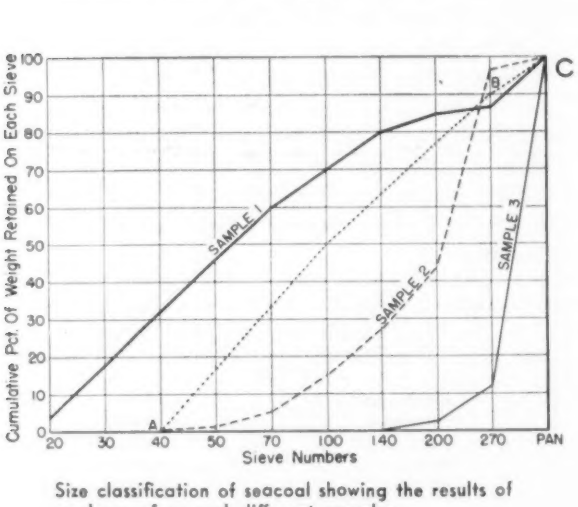
The gas forming quality which is indicated by the ratio of volatile matter is the most significant characteristic of the seacoal. The ash content should be as low as possible to avoid serious contamination in the sand heaps. Sulfur compounds are also undesirable in the molding sands. Furthermore, the moisture in the seacoal should be low to facilitate the mixing of the seacoal in the sand.

The fineness to which the coal is ground influences its effects in the facing sand. A seacoal composed of very fine particles, 270-mesh, is un-

favorable because the volatile matter is released too rapidly. The fine particles of seacoal are undesirable because they lower the permeability of the sand mixtures. Furthermore, there is always the possibility of very fine particles being lost by air currents during handling and mixing. Large particles of seacoal may swell and produce sufficient gas to penetrate the casting surface, causing pitting.

The following requirements as to particle size of seacoal are satisfactory for most applications: 100 pct of seacoal through 40-mesh sieve; over 50 pct of seacoal through 100-mesh sieve and less than 10 pct of seacoal through 270-mesh sieve.

The size classification of any sample of seacoal can be found by passing a definite weight, usually 50 g, of the dry material through a set of standard sieves, weighing the amount retained on each sieve, and finally plotting the cumulative percentages of these weights on a graph. The results of the analyses of several different seacoals are recorded on the chart below. The limits of the specified requirements as to particle size are indicated by the line A-B-C. Those seacoals which are represented by lines to the right of A-B and to the left B-C will satisfy the established size requirements. Sample 1 is too coarse; sample 3 is too fine, but sample 2 is within the size limits specified.



Size classification of seacoal showing the results of analyses of several different samples.

As the metal sections increase in thickness, which is equivalent to exposing the mold surfaces to greater amounts of heat, larger ratios of seacoal are required. For castings having sections of ½ to 1 in., the molding sand usually contains 1 part by volume of seacoal to 8 parts by volume of sand. This proportion of seacoal is equal to 4 pct of the weight of the sand. For heavier metal sections, the seacoal content may be increased to 6 pct of the weight of the molding sand.

The aim should be to use as little seacoal as is consistent with the finish required on the castings. Too much fine seacoal in the facing sand will cause the surfaces of the castings to take on a veined appearance. An excessive amount of seacoal in the facing sand may produce sufficient gas to cause blows in the castings.

Uniform distribution of the seacoal throughout the sand is necessary to obtain the beneficial effects of the seacoal on all surfaces of each casting. Therefore, the seacoal should be thoroughly mixed with the sand and other ingredients in the facing mixtures. For those installations in which only one type of sand is used in the molds, the seacoal is supplied regularly at some point in the system. The amount of seacoal added is determined by the condition of the surfaces of the castings and from tests on the seacoal content of the molding sand.

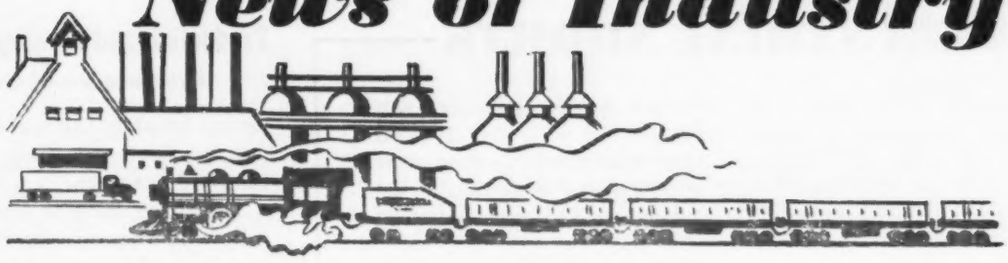
Additions of seacoal affect the physical properties of molding sands. Green strength is increased because of the finely divided state of the seacoal. Hot strength is decreased at intermediate temperatures and then increased at higher temperatures. Permeability is decreased both at ordinary temperatures and high temperatures. Flowability is decreased as a result of higher green strengths. Furthermore, the decrease in the expansion of the sand results in less spalling and cracking of the mold surfaces.

The economical use of seacoal requires the control of the proportions of this constituent in the sand mixtures. When the most desirable ratio of seacoal is established for a given practice, this ratio should be maintained in the facing sand. Some seacoal is unavoidably lost or rendered ineffective from exposure to the high temperatures in the molds.

A simple method for finding the seacoal content of molding sand mixtures requires the preparation of samples of typical sand mixtures containing known percentages of seacoal. These samples are prepared from the same sands and binders in the same ratios as used regularly in the facing sand for a given system. Dry seacoal is added to the samples in amounts varying from 1 to 6 pct of the weight of the sand mixture. The loss on ignition is then found for each of the mixtures containing the seacoal. This procedure requires the weighing of 5.00 g of the mixture in a porcelain crucible and heating to temperatures which will remove all volatile and combustible matter. The results obtained are plotted on a graph, using as coordinates seacoal percentage by weight and loss on ignition in grams. The points on the graph are connected by lines.

Samples of sand from the same system, but containing unknown amounts of seacoal, are first dried. Then 5.00 g of each sample are weighed in a porcelain crucible and the loss on ignition is determined in the same way that the known samples were treated. By referring to the graph, the seacoal content can be derived from the loss in weight of this sample.

News of Industry



Production, Earnings Records May Fall

Steel officials see capacity operations beyond second quarter . . . Record capacity would permit new records . . . Coal hampers first quarter results—*By BILL PACKARD*

New York—The most significant information in steel company first quarter financial reports is not the record of earnings, but the forecasts of what steel officials think is in store for their industry. Their statements on current business and how they think it will fare during the remainder of the year verify the boom market in steel which THE IRON AGE has been reporting for several weeks.

First quarter earnings of the steel industry were fairly good. But they do not compare favorably with the first quarter of last year, which was one of the best in steel history. However, they are far better than the last quarter of 1949, when operations were affected drastically by the steel strike.

Coal Hampered Operations

First quarter earnings undoubtedly would have been a lot better had it not been for the coal crisis which culminated in a strike during February. This hampered operations and raised costs of every company. But some were affected worse than others. The adverse effects were milder than those of the steel strike on fourth quarter operations last year.

During the first quarter of this year the industry operated at an average rate of 90.4 pct of rated capacity, according to American Iron & Steel Institute. These operations resulted in a total output of 22,169,924 tons of steel. During the record breaking first quarter last year the industry operated at 101.5 pct of capacity and turned out 24,052,146 tons of steel. The previous record was the first quarter of the wartime year, 1944, when 22,612,869 tons of steel were turned out.

Following the coal strike, operations rebounded sharply and climbed steadily, reaching the high nineties late in the first quarter. Significantly, the operating rate is now leveling off above 100 pct of rated capacity. Barring unex-

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STEEL COMPANY EARNINGS

Company	First Quarter 1950 Earnings	First Quarter 1949 Earnings
U. S. Steel	$49,217,742	$49,928,670
Bethlehem Steel	25,572,930	33,129,574
Republic Steel	13,850,000	15,298,628
Jones & Laughlin	5,309,828	9,868,895
National Steel	13,434,454	14,753,775
Armco Steel	11,894,130	8,404,861
Youngstown Sheet & Tube	7,490,941	12,022,660
Inland Steel	9,320,463	9,254,230
Sharon Steel	1,633,630	2,905,301
Wheeling Steel	3,187,696	4,010,137
Colorado Fuel & Iron	1,613,078	2,518,797
Pittsburgh Steel	1,016,592	2,185,508
Crucible Steel	759,451	1,714,315
Granite City Steel	1,201,879	821,018
Copperweld Steel	185,721	715,637
Alan Wood Steel	318,011	1,385,687
Midvale Co.	—178,362	38,816
Allegheny Ludlum	2,270,681	1,542,195
Continental Steel	840,071	203,086
Keystone Steel & Wire	1,922,068	1,248,354
Carpenter Steel	720,953	537,245
Rotary Electric Steel Co.	310,841	1,097,052

AS THEY SEE IT

IRVING S. OLDS, U. S. STEEL—

"Demand will remain strong through the second quarter. During the second half there will probably be a slow decline. It will not be sharp or deep. On the whole, I would say 1950 will be a good year, a very good year, for steel."

BEN MOREELL, JONES & LAUGHLIN

"Our operations will probably hover around the 100 pct mark, plus or minus, during the next 8 months, if we are allowed to produce. Despite the present clamor for virtually all steel products, I don't feel there is going to be a real shortage. Production will gradually catch up with demand without hardships."

EUGENE G. GRACE, BETHLEHEM—

"The steel outlook is definitely good. We should be able to maintain full operations through the third quarter—barring unforeseen trouble . . . Demand is general but railroads and construction are showing surprising strength."

ERNEST T. WEIR, NATIONAL STEEL—

"The industry could break all production records this year if there are no interruptions in production . . . The present so-called shortage of steel is a result of the steel strike last fall and the coal strike in February."

INDUSTRIAL SHORTS

INCREASES CAPACITY — A new sintering plant is being erected at the Lackawanna, N. Y., plant of BETHLEHEM STEEL CO. costing about $4 million. It will have a capacity of 4500 tons daily.

MINING ORE—It has been announced by the CLIMAX MOLYBDENUM CO., New York, that they are planning to engage in the mining and processing of uranium-vanadium ores on the Colorado Plateau. A mill will be constructed at Grand Junction, Colo., having a capacity to treat from 50 to 100 tons of ore per day.

SHIFTS OPERATIONS — The idle Applied Optical Industries plant in Hamburg, N. Y., has been purchased by the RITTLING CORP., Buffalo, for the consolidation of its manufacturing operations. This purchase is part of a $150,000 expansion program for the heating equipment manufacturer, which will double its employment and more than double production.

CHANGE OF ADDRESS — After more than 40 years in Pittsburgh's Oliver Bldg. the MAX SOLOMON CO., iron and steel scrap dealers, have moved to 3045 W. Liberty Ave.

HOSE PRODUCTS—The Pennsylvania Flexible Metallic Tubing Co., Philadelphia, have appointed the BOSTON WOVEN HOSE & RUBBER CO. OF PITTSBURGH as their distributor in the Pittsburgh area. Penflex products include blower and ventilation hose, tar and asphalt hose, marine unloading hose, and hose for gasoline pumps, tank wagon distillates and fuel oil.

EASTERN REP — The Stoody Co., Whittier, Calif., manufacturers of hard-facing alloys, has appointed MORRIS, WHEELER & CO., INC., Philadelphia, as its distributor in Eastern Pennsylvania, New Jersey, Maryland and Delaware.

SCRAP FOR SALE—Bids will be accepted until May 17th on approximately 1121 gross tons of iron and steel scrap by the Salvage Agent, BLUE GRASS ORDNANCE DEPOT, Richmond, Ky. The offering consists of about 941 tons of No. 1 heavy melting steel, 110 tons of No. 2 light melting steel and 70 tons of No. 2 bundle material.

DOUBLES FACILITIES—The new physical, chemical and metallurgical laboratories of EDWARD VALVES, INC., East Chicago, Ind., opened less than a year ago, are being increased nearly 50 pct in size with the construction of a new unit, for which ground was recently broken.

DIECASTING FILM—The Jam Handy Organization has signed a contract with the DOEHLER-JARVIS CORP., New York, to produce a moton picture on the diecasting process. The film will take about 25 min. and should be ready for distribution by early autumn.

BUILDING PRESSES — The Arthur Colton Div. of the SNYDER TOOL & ENGINEERING CO., Detroit, will build and market powdered metal presses, incorporating the designs patented by John Hallar, president of Michigan Powdered Metal Products Co., Northville. The new Colton-Hallar presses will be made in four capacities ranging from 25 to 125 tons.

SERVING AGAIN — John E. Echlin, president, Echlin Mfg. Co., New Haven, Conn., has been reelected president of the CONNECTICUT METAL TRADES ASSN. Other officers reelected were: Robert J. Doran, vice-president; Thomas I. S. Boak, treasurer; and William G. McCaw, secretary.

MOVES UPTOWN—METAL & THERMIT CORP. has moved its general offices from 120 Broadway in downtown New York to 100 E. 42nd St.

Production and Earnings

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pected trouble, the second quarter may break records, both in production and earnings.

This prediction is based on the following factors: (1) Operations are above 100 pct of rated capacity. (2) The industry's capacity is larger than it has ever been before. (3) This high rate of production is supported by terrific demand, which is general for nearly all major steel items. (4) Inventories of steel users are not large, are in fact considered unsatisfactory in most cases. (5) Traditionally cautious steel officials are predicting capacity output through the second or third quarter. (6) Steel company order backlogs are bigger (they average about 5 months at current production rates), and pressure from consumers is still growing.

Exports Are Shrinking

The industry's modernization and expansion plans are going ahead smoothly. U. S. Steel expects to spend slightly less than last year, Bethlehem slightly more. J & L and National Steel are also raising their sights.

Pension costs took a big chunk out of receipts, but these were offset by raising steel prices last December.

Steel exports are shrinking. During the first quarter U. S. Steel's exports equaled only 3 pct of their output. At the same time Bethlehem's export bookings were only 3.6 pct of their total, the lowest since 1936. This reflects high domestic demand, as well as increasing output abroad.

New England Steel Corp. To Hold Steel Site Survey

Boston — The newly-activated New England Steel Development Corp. will conduct studies for the possible building of an integrated steel mill in Connecticut's New London area, announced Frederick S. Blackall, Jr., chairman of the New England Council's Steel

Committee. The study had been urged by Gov. Bowles who made $60,000 available to conduct it through the Connecticut Commissioners of Steamship Terminals.

Mr. Blackall said that a subcommittee of the Steel Committee had been chosen and would deal with the state to take advantage of the $60,000 offer. On the subcommittee are: Clifford S. Strike, president, F. H. McGraw Co., Inc., Hartford; Richard L. Bowditch, president, C. H. Sprague & Son Co., Boston; John S. Chafee, executive vice-president, Saco-Lowell Shops, Biddleford, Maine; Robert G. Ashman, president, Newman-Crosby Steel Corp., Pawtuckett, R. I.; and Robert P. Tibolt, vice-president, Eastern Gas & Fuel Associates, Boston.

Steel Inquisition Hints Justice Dept. Suit

Rep. Celler bluntly questions right of U. S. Steel to be "big" . . . Fairless criticized for going over heads of bureaucrats in Venezuelan negotiations—*By GEORGE BAKER*

Washington—The not-too-heavy veils concealing the basic purpose of the steel monopoly probe conducted by Rep. Emanuel Celler, (D., N. Y.), chairman of the House investigating subcommittee, were parted for an instant to show clearly that brick by brick a foundation is being laid for a Justice Dept. suit to dismember the nation's largest steel companies.

While Celler was careful in grilling Ben Fairless and U. S. Steel officials to avoid direct disclosure of this purpose, the nature of his questions clearly revealed it.

"Getting Too Big"

What Celler termed the "unrelated activities" of U. S. Steel were subjected to particular criticism last week. "Your company is getting too big," Celler commented on the company-owned Isthmian Steamship Co. Isthmian, he said, is of "no advantage" to U. S. Steel. Fairless countered, "So after we build up these companies—subsidiaries—you're telling us we shouldn't have them."

Later, Celler demanded if the company could not operate "just as efficiently and profitably" if it did not own a cement company. "Certainly not," Fairless snapped back. "We can do a great job by promoting new uses for steel through cement."

Turning to a discussion of U. S. Steel's new iron ore development program in Venezuela, Celler criticized Fairless for his "failure" to deal with Washington bureaucracy in negotiating contracts with the Venezuelan government.

Correction Needed

When Irving S. Olds, U. S. Steel board chairman, pointed out that there was "nothing secret" about such negotiations, but that he saw "no need" for a bureaucratic detour, Celler expressed his view that such a situation should be "corrected."

In his opening statement before the committee, Fairless surprised members of both political parties with a tensely-worded picture of U. S. Steel's activities that represented a departure from past factual but colorless presentations.

"U. S. Steel is successful, profitable, efficient, and large," he declared. "Within our government today there are powerful agencies and groups which hold that all this is wrong. They hold that there is something inherently vicious in bigness, and growth, and success. These advocates of dissolution are the most dangerous reactionaries of this century."

"By dismembering business, they would turn back the clock to the horse and buggy days of 50 years or more ago, and would try to squeeze a modern, dynamic, efficient America once more into the puny production patterns of its industrial childhood," he said.

Officials of The National Steel Corp. and of several "smaller" producing firms are scheduled to tell their stories before the committee late this week.

GE SCIENCE TRAIN: A major exhibit in the "More Power to America Special" power generation section is being examined by J. W. Belanger, (left), assistant general manager of the General Electric Apparatus Dept., and E. E. Parker, manager of engineering of the department's Turbine Divisions. The 10-car train, sponsored by the General Electric Apparatus Dept., parked first at Grand Central's track 30, New York. It will tour key industrial centers.

Great Lakes Advance Vessels Start to Move

Security of adequate stocks vanishes . . . Emergency loads urged by shippers . . . May 1951 ore famine held possible . . . Supporting bill rushed into Senate—*By BILL LLOYD*

Cleveland—Complacency of iron ore consumers engendered by erstwhile adequate stocks despite ice-blocked conditions in the Great Lakes that stall the full opening of the iron ore season is ebbing fast to worry. Stocks have dwindled to a scant 13,500,000 tons.

First Vessels Move

Of small comfort was the movement of advance elements of the fleet toward the Soo last Friday when the green light was flashed by the ice committee of the Lake Carriers Assn. Ships berthed in lower Lake ports are to start in limited number for Lake Superior.

To avoid congestion in the St. Mary's River, the Coast Guard cutter, Tamarack, stationed at the detour, will control passages. All vessels are asked to obtain clearance and latest reports on ice conditions from L. F. Hammett, of the Pittsburgh Steamship Co., before departure.

At the head of the lakes several vessels are loading ore at Two Harbors and are expected to cart the season's first ore cargoes through the Soo this week.

Great Lakes shippers are faced with the staggering problem of moving 80 million tons of ore from Upper Lakes ports in a new short season ending in the fall. They are pressing for permission to use emergency load lines for vessels in the bulk freight trade.

Deeper Loading Proven

Lake Carriers' Assn. officials claim that deeper loading was proven safe during the war emergency and would enable the fleet to bring down between 2 and 3 million additional tons of ore.

Citing the latest shipping start in 45 years and that steel mills will require maximum ore deliveries, the LCA requested Coast Guard Commandant Merlin O'Neill to waive the Coast-wise Load Line Act of 1935. His authority to do so expires on June 30.

To extend the Commandant's authority until June 30, 1951, Sen. Edwin C. Johnson (D., Colo.), chairman of the Senate Committee on Interstate and Foreign Commerce, introduced such a bill in the Senate on Apr. 24.

May 15 Opening

Shippers estimate that the late start has already cost them 9,367,579 tons. Present consumption of Lake Superior district ore is about 7 million tons per month. If the fleet can move 75 million tons with good weather and consumption continues at the present rate, they say, a critical shortage may easily exist next May.

While there is no overall shortage of iron ore now, some consumers are short of certain grades and tonnages are being traded and transferred in an effort to maintain present production. For the first time in the history of Ashtabula, Ohio, a cargo of ore was loaded into a ship there, for shipment to Buffalo. An estimated 10,000 tons has been moved from Cleveland to Lorain. Manganifer-

March Iron & Steel Production by Districts

As Reported to American Iron & Steel Institute

BLAST FURNACE CAPACITY AND PRODUCTION —NET TONS	Number of Companies	Annual Blast Furnace Capacity	PRODUCTION							
			PIG IRON		FERRO-MANGANESE AND SPIEGEL		TOTAL		Pct of Capacity	
			Current Month	Year to Date	Current Month	Year to Date	Current Month	Year to Date	Current Month	Year to Date
Distributed by Districts:										
Eastern	12	13,353,580	887,186	2,606,712	30,206	82,412	917,392	2,689,124	80.9	81.6
Pitts.-Youngstn.	16	26,735,520	1,654,488	5,224,358	9,225	51,510	1,663,713	5,275,868	73.2	80.0
Cleve.-Detroit	6	7,044,600	528,822	1,598,523			528,822	1,598,523	88.4	92.0
Chicago	7	15,897,190	993,308	2,928,277			993,308	2,928,277	73.5	74.7
Southern	8	5,141,250	337 891	1,064,983	6,340	17,283	344,231	1,082,266	78.8	85.3
Western	4	3,325,400	153,575	493,562			153,575	493,562	54.4	60.2
Total	36	71,497,540	4,555,270	13,916,415	45,771	151,205	4,601,041	14,067,620	75.7	79.8

STEEL CAPACITY AND PRODUCTION —NET TONS	Number of Companies	Annual Steel Capacity	PRODUCTION							
			TOTAL STEEL				Alloy Steel* (Incl. under total steel)		Carbon Ingots-Hot Topped (Incl. under total steel)	
					Pct of Capacity					
			Current Month	Year to Date	Current Month	Year to Date	Current Month	Year to Date	Current Month	Year to Date
Distribution by Districts:										
Eastern	25	19,875,460	1,493,064	4,224,953	88.4	86.2	92,771	x284,330	268,142	x783,547
Pitts.-Youngstn.	34	39,145,920	2,780,391	8,503,805	83.6	88.1	361,083	1,092,999	278,474	x887,010
Cleve.-Detroit	8	9,333,460	790,255	2,268,358	99.7	98.5	40,800	115,654	115,384	308,717
Chicago	15	20,777,520	1,680,699	4,943,939	95.2	96.5	128,146	378,321	234,414	707,543
Southern	8	4,560,820	351,341	1,081,041	90.7	96.1	5,734	12,922	6,578	13,782
Western	11	5,699,620	391,286	1,188,557	80.8	84.5	7,157	24,203	4,725	19,588
Total	80	99,392,800	7,487,036	22,210,653	88.7	90.6	635,691	x1,906,429	907,714	x2,720,187

* For the purpose of this report, alloy steel includes stainless and any other steel containing one or more of the following elements in the designated amounts: Manganese in excess of 1.65%, and Silicon in excess of 0.60%, and Copper in excess of 0.60%. It also includes steel containing the following elements in any amount specified or known to have been added to obtain a desired alloying effect: Aluminum, Chromium, Cobalt, Columbium, Molybdenum, Nickel, Titanium, Tungsten, Vanadium, Zirconium, and other alloying elements. x Revised.

ous ore has been moved to Weirton.

Ore from Escanaba, Mich., is being moved to points where it is most needed, regardless of whose ore it is, shippers pointed out, but the tonnage is not sufficient to ease the shortage. Less than 5 pct of the Great Lakes ore movement originates at Escanaba, in a normal year, and one company has already moved 16 pct of its estimated season's tonnage from Escanaba, or as much tonnage as would normally be moved by June.

Despite frantic efforts by shippers and the Coast Guard, particularly the ice-breaker Mackinaw, industriously smashing away in the Upper Lakes, full-scale movement of the fleet before May 15 was remote this week.

Mill to Run at 1000 fpm

Franklin Park, Ill.—Slated for Fall completion, the Thompson Wire Co.'s single-stand reversing mill here will operate at a strip speed of 1000 fpm with General Electric electric drives and controls.

GE equipment includes a main drive mill motor rated at 1000 hp, 500/1000 rpm, 600 volts; two reel tension motors rated at 300 hp each; a flattener motor; and the main motor generator.

Buffalo-Erie Steelmen Meet

Buffalo—Steel casting industry progress was discussed at a meeting of steel foundry men of the Buffalo-Erie area last week. The regional conference was sponsored by the Technical and Operating Group No. 2, Steel Founders' Society of America. Particular attention was given to advances in foundry dust and smoke control.

Seeks Pipeline Building Permit

Washington—Central Kentucky Natural Gas Co. has applied for permission to construct an additional 32 miles of 20-in. loop pipeline in Nicholas County, Ky. Cost is estimated at $2.2 million, including an 880-hp compressor unit.

Metal Powder Parts Audition for Television

Metal Powder Assn. meets in Detroit . . . Offers new developments for TV production . . . Secretive Mr. Haller exhibits Swiss cheese parts . . . Swede powder parts samples hit.

Detroit—Poised for a leap in any direction to which their industry can be turned, more than 300 powder metals men, aggressive and avidly curious in keeping with the boom in their field, were pushing their new ferrites line, metal oxides pressed or extruded into cores, as the shining hope of television.

Latest in Flake Form

They claimed at the 2-day meeting of the Metal Powder Assn. last week that the metal oxide cores permit the production of high output transformers the size of the average human finger for high frequencies in the range of ¼-25 megacycles.

Another powder metals wedge into the video field is recently developed core materials for transformers that powder men say are far superior to anything existent. The latest introduction is a flake form of these oxides, which are really theoretical acids.

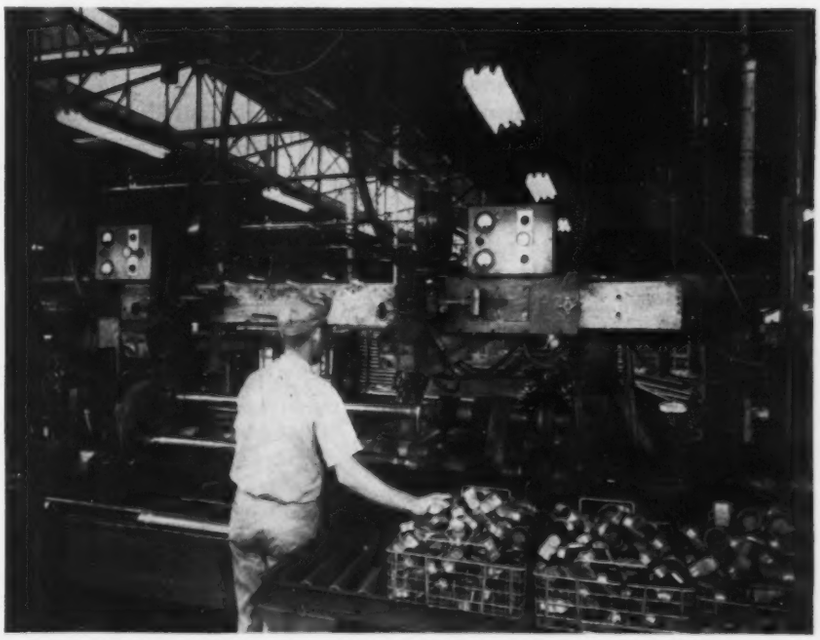
Powder metals men made it clear at the meeting that their field was thriving and young and just starting to flex its muscles. They point out a momentous trend —industry is swinging around to designing powder metals parts instead of mere substitutions. It may be the reason that at present there are not enough presses to go around, they say.

They are also aware that in April more foreign powder metals were imported than ever before. It is a sore point but they have been so occupied with filling orders that they have had no time to organize a collective protest.

Methods Are Described

At one informal meeting three methods of making parts were described. They were for soft porous low strength parts, hard com-

SEE, NO HANDS: This completely automatic welding machine joins universal yokes with 2¾-in. automobile shafts in 11-sec at Borg Warner's Mechanics Universal Joint Div. in Memphis. Conveyors mate the yokes and shafts and two standard Lincolnweld hidden-arc units make the union permanent. Cecil C. Peck Co., Cleveland, made the machine.



pacted sintered high strength dense parts, and the common porous parts filled up by infiltration with other materials.

Haller's Minor Miracle

Resentment against Swedish powder metals men recently departed from this country after displaying some excellent samples was expressed. One MPA member gave the gist of consensus by saying that "anybody can make a super-duper sample but duplicating it in production is another matter."

John Haller, of the Michigan Powder Metals Products Co., displayed at one of the 24 exhibits compacted powder parts to which the Swiss cheese principle had been applied. The holes serve as oil reservoirs and increase self-lubricating properties to such an extent that eyes open in wonder. Members indulged in brisk guessing games to determine the secret process by which Mr. Haller accomplished his minor miracle.

The intensive technical sessions conducted formally and otherwise at the MPA Sixth Annual Meeting, were keynoted by debates and shrewd questioning.

U. S. Steel Verifies Eastern Mill Plan

Chairman Olds says integrated Eastern mill definitely will be built . . . Would have 2 million ton ingot capacity . . . Seen as strong bid for Eastern market.

New York—Now it is official—U. S. Steel is definitely going to build an Eastern Steel Mill (THE IRON AGE, Feb. 2, p. 109). The large, integrated mill will be located at the Morrisville, Pa., site, purchase of which was announced early this year.

First official verification of this decision was made by Irving S. Olds, chairman, at a press conference here last week. Mr. Olds said "it will be a mill designed to make products in demand in the area which it will serve—certainly including flat-rolled products such as sheets." Annual ingot capacity will probably be about 2 million tons.

Financing Delay

Although he refused to predict when construction would start, he said engineers are now working on plans for the project. He indicated that the mill may be built in stages, with either the finishing facilities or the basic iron and steel making units being completed first.

Mr. Olds admitted that details of financing and planning are delaying actual construction work. While these details are chewing up valuable time, they are not believed to include any problems so thorny as to postpone start of construction past 1951.

For a long time Big Steel has had to play second fiddle to Bethlehem in the lucrative Eastern market. Steel from Sparrows Point serving the New York industrial area enjoys a $4 a ton competitive advantage over steel from Pittsburgh. Since the customer pays the freight, he must now pay $4 a ton more to buy steel from Pittsburgh. If the companies were to again absorb freight it would mean that $4 a ton would have to be lopped off the profit of Pittsburgh firms serving this market.

Although Mr. Olds didn't comment on the competitive aspects of the new mill, it is apparent that Eastern consumers are going to be wooed as they've never been wooed before.

Ore from Venezuela

Raw materials will be no problem. The Corporation's iron ore bonanza in Venezuela and the Eastern mill are inextricably bound together in its plans for the future. The South American ore will start arriving about 1954-55, probably at an annual rate of 10 million tons. This ore will supply the new Eastern mill, as well as the Tennessee Coal, Iron & Railroad Co., a subsidiary at Birmingham.

Whether basic iron and steel making facilities or finishing facilities are finished first will depend on how fast the ore development can be brought along. If the ore development is delayed, the finishing facilities will be fed with semifinished steel from Pittsburgh.

Weirton Steel Co., Union Agree on Vacation Pay Plan

Weirton, W. Va.—Weirton Steel Co. employees will receive more than $2 million in vacation pay this year under an agreement between the company and the Weirton Independent Union, Inc.

Employees who choose to work instead of taking a vacation may do so and receive an equivalent in vacation pay. The plan applies to 13,000 workers in the bargaining unit.

Electrification Loans Given

Washington — The Rural Electrification Administration has announced ten new loans of about $4.3 million to electrification co-ops in six states—Colorado, Missouri, Texas, Ohio, North Carolina and Maine.

Invest Capital from Savings Into Postwar Business Ventures

Washington—About 166,000 new manufacturing firms were established during the first 3 postwar years. According to the Office of Business Economics, 75 pct of the investment capital was obtained from personal savings of those connected with the new ventures.

Of the $2 billion invested, about $800 million went into new plants and equipment, another $400 million into used facilities and equipment, about $500 million for working capital and $300 for inventories.

Revere Copper Earnings Up

New York — Revere Copper & Brass Inc. for the 3 months ended March 31, 1950, shows a net income of $2,086,939, against $1,554,493 for the same period last year. The increase in profit during the first quarter of this year over the same period of 1949 was due principally to a substantial increase in output, company officials stated.

Plastic Society Meets

New York—The emphasis was on film, sheeting, and coated fabrics at the first Plastics Film and Sheeting Conference held by the Society of the Plastic Industry, Inc., recently in the Commodore Hotel.

New Treatment May Boost Wider Use of Aluminum Castings

Cleveland—Wider use of aluminum castings is predicted by Raymond Deutsch, president of Monarch Aluminum Mfg. Co., due to a new way of treating aluminum permanent mold castings. The process, called "Velvaglaze," actually seals the pores of the casting and increases its wearing qualities.

At present, Monarch is supplying several volume production castings using the Velvaglaze process. Initial tests indicate that in addition to the surface improvement the process retards, and in some cases resists, corrosive action to a degree not possible on the ordinary commercial aluminum casting.

One of the best applications to date is on washing machine agitators. These, says Mr. Deutsch, are being greatly improved at reasonable cost. The smooth hard surface has no sharp edges or rough spots to snag clothes. The finish also resists the corrosive action of hard water, harsh soaps and detergents.

Truckers Counter with Own Rate Cut Move

They suspend rate increases set for May 1 to offset ICC-approved rail reductions . . . Plan for court fight scrapped . . . Spokesman sees some business switching to rails.

Pittsburgh — Highway haulers hastily suspended their higher trucking rates which were slated to go into effect on May 1, coincidentally with reduced rail rates on 80,000 lb carload shipments of iron and steel products. They now plan to file with the Interstate Commerce Commission a new rate schedule on 40,000 lb shipments, or perhaps as low as 32,000 lb to meet the rail threat.

No Court Fight

An ICC approval of the lowered rail rates proposed by Eastern roads prompted a truckers' meeting in Cleveland last week. They postponed institution of their increases on 20,000 lb minimum shipments until June 1, and meanwhile will be seeking ICC sanction of their own new rates.

Earlier plans for a last-ditch court fight against the railroad's accomplished strategy were abandoned in favor of the new plan.

Back to the Track

The new rail rates, representing reductions of 25 pct and more on rates for 40,000 lb minimum carload shipments, are lower than existing truck rates, and considerably lower than the higher rates proposed for May 1 (THE IRON AGE, Apr. 20, p. 103).

A spokesman for the truckers conceded that the reductions will attract more tonnage to the rails and reverse the trend of the last 3 years toward shipping by truck, but he predicted that the new rates will prove non-compensatory.

Rates to Be Balanced

He expected at least a 25 pct loss of the iron and steel hauling back to the rails. A study by the railroads last December indicated that the trucks were hauling more than 52 pct of the iron and steel tonnage and more than 72 pct of the sheet and strip.

Indications are that the railroads will be required to reduce the rates on shipments of aluminum to balance the existing spread between aluminum and steel shipping charges.

Better Insight

New York—More insight into lubrication problems has been gained by The Texas Co. engineers. They have built a transparent plastic bearing and now can see and photograph the behavior of oils and greases in bearings under different loads and speeds. Oil holds bright red dye to show lines of flow and scales measure friction drag. The machine can be adapted to study ball and roller bearings and was built at the Texaco lab at Beacon N. Y. It is operating at the Engineering Experiment Station of the Penn State College.

Cerro Bolivar Ore Removal Plans Discussed at Miraflores

Orinoco dredging plan and proposed long railroad method considered.

Miraflores, Venezuela—Cerro Bolivar, the iron ore mountain destined to slake the hunger of the American steel industry for ore, is still undefiled by steam shovel and truck. Its discovery came propitiously — when steel men were beginning to wonder where their next million tons of ore were coming from. What stands paramount now is the removal of the mountain.

Interest on Two Plans

Members of the Venezuelan Military Government and representatives of the Orinoco Mines Co. met here recently to thrash out the transportation method for ore removal. Interest focused on two plans—a railroad to run over a new bridge spanning the Orinoco River and a short railroad coupled with Orinoco dredging operations.

The dredging plan was submitted by Orinoco Mines men: Mack C. Lake, General Max Tyler, Harmon Lewis, Dr. Jose Maria, Travieso Paul, and Worthen Davenport, all of whom had returned from a visit to Guayana where they checked the river's possibilities.

Before the meeting opened observers knew that the company men favored the dredging plan because it was less expensive and government officials wanted the longer railroad because it would serve not only the company but their country. Final decision is the government's.

Short Versus Long

Company men proposed transportation of Cerro Bolivar ore to a point near San Felix, 100 kilometers by a short railroad from Ciudad Bolivar. There, ore would be loaded on large ships. The Macareo Passage, an arm of the Orinoco delta, would have to be dredged. Cost would run to $100 million and dredges would always be on hand to assure depth. The latter operation would cost $10 million per year.

The alternate route involves the construction of a standard gage, modern railroad to Guanta over a new $24 million bridge across the Orinoco. The road would link Guayana with economically-important coastal regions.

Cleveland Council Chooses Chief

Cleveland—Dr. H. B. Osborn, Jr., technical director of the Ohio Crankshaft Co., was voted the new president of the Cleveland Technical Societies Council, comprised of this city's 42 technical and scientific groups with a membership of 13,000.

H. B. Osborn

Dr. Osborn is also chairman of the Cleveland Chapter of the American Society of Tool Engineers and chairman of its national membership committee. An induction heating expert, Dr. Osborn has conducted lectures on this subject to technical groups across the country.

Britons View Foundry Field

Washington—Two British groups, under Marshall Plan sponsorship are beginning a 6-week study of American brass foundry methods. One group, representing government and management, is interested in management accounting. The other, composed of specialists and workers, will study manufacturing techniques and methods.

Strikes Drop French Production

Paris—March's widespread strikes in France struck a blow at the French iron and steel industry. Production of pig iron fell from 634,000 tons in February to 475,000 tons in March, steel production from 722,000 to 506,000 tons, and rolled finished products from 494,000 tons to 343,000.

American Foundrymen Plan Cleveland Meeting on May 8-12

Cleveland—How reclaimed sand can be used to advantage by the foundry industry will be demonstrated by a $2 million exhibit built by four cooperating companies at the 54th Foundry Congress and Show of the American Foundrymen's Society on May 8-12 in the public auditorium here. Exhibiting firms number about 250.

Another highlight will be the first American public showing of the recently developed German "croning process" for making sand molds and cores.

Congress on May 10

The firms that built the "sand" exhibit are: National Engineering Co., Chicago; International Molding Co., Chicago; Foundry Equipment Co., Cleveland, and the Campbell-Hausfeld Co., Harrison, Ohio. The German process will be unveiled by the Bakelite Div., Union Carbide and Carbon Co., New York.

To be opened by Edwin W. Horlebein, of the Gibson & Kirk Co., Baltimore, on May 8, at 10 a. m., the Congress will feature about 85 technical papers and discussions of foundry operations.

Nominated as president and vice-president for the new term are Walton L. Woody, of the National Malleable and Steel Castings Co., Cleveland, and Walter L. Seelbach, president of the Superior Foundry Co., Cleveland. Mr. Woody is now the vice-president. Elections will be on May 10.

Directorship Candidates

Director for one year is retiring president Edwin W. Horlebein, Gibson & Kirk Co., Baltimore. Director nominees for 3 years are: J. J. McFadyen, Galt Malleable Iron Co., Galt, Ontario; J. O. Ostergren, Lakey Foundry & Machine Co., Muskegon, Mich.; Frank W. Shipley, Caterpillar Tractor Co., Peoria, Ill.; James Thomson, Continental Foundry & Machine Co., East Chicago, Ind.; and E. C. Troy, National Engineering Co., Palmyra, N. J.

Warehouse People Hold Huge Pep Session

Delegates leave annual meeting loaded for bear . . . "Give us more steel to sell" is their theme song . . . They see no early letup in general business—*By TOM CAMPBELL*

Houston—When members of the American Steel Warehouse Assn. left here last week they were loaded for bear. The injection of "restrained" optimism of the Texas variety did its job; and the grandeur of the Shamrock Hotel added an extra lift.

If warehouse sales don't boom now it won't be the fault of Major Domo Walter Doxsey—re-elected president of the group which last week finished its 41st annual conclave. He had his plans down so pat that he even produced a few small tornadoes for the members.

The Theme—More Steel

The theme song ringing through the corridors of the hotel was usually the same—"when do I get more steel." Those brave steel salesmen who turned up at the meeting should get some kind of a decoration from the home office. They did a good job of explaining. If they didn't quite do that, their very presence was enough to let their would-be or regular customers get steam off their chests.

There were some here and there who were still cautious about the outlook for steel business. But they were in the minority. There were others who swore that the only way to keep a warehouse business going was to get the shine off the pants by selling the stuff.

No Letup in Business

This was truly an individualistic, at times stubborn and friendly group with as many ideas as there were people. But there was agreement on one thing—they saw no sign of any letup in general business in sight. The biggest worry was "why didn't I stock up last year when I had the chance."

One highlight of the meeting was a rip-roaring talk about selling steel and the steel business by Larry Hamaker, assistant general manager of sales, Republic Steel Corp. Larry was more than optimistic, he was super-optimistic about the future of steel and he backed up his observations with plenty of good ammunition.

Expects Long Term Gains

Mr. Hamaker thinks there is good business for steel people in the next decade. We will have to go after it but the stage is set, he believes. Yet he warned that the very Administration which praised the job American business did during the war is now trying to tear it down.

Running through his talk was evidence that this Republic steel official believed that: If full advantage is taken of present and future needs; if population figures are studied and used as a guide; if good salesmanship is the keynote; and if the government does not succeed in its smearing tactics, the next 10 years should make the 1900 type businessman think he is out of this world.

Received Less Steel

Walter Doxsey, association head, gave the boys a down-to-earth report on their group. He made it plain that they were to be served. All they had to do was be active in the group. He also underscored that the association had nothing to do with prices and they had nothing to do with any selling boundaries. But more important, he reviewed the warehouse people's '49 share of available steel.

Warehouses got less steel last year than in 1948 but there was less steel made. The drop in production was close to the drop in warehouse participation—about 13 pct. Results of a survey showed that warehouse people in 1949 did not make as much profit as in 1948 but since no actual figures were given as to money profits (only percentages were used) the full significance was not clear.

Helped Out in Jam

One thing was certain. Steel warehouse people were a great help to some of those manufacturers who were caught short of steel last fall and early this year. Only because of warehouse service were some large companies able to keep up their production until steel mills were back in the race. Now warehouses are trying to build up their own stocks and they are less weary than they were last year of heavier inventories, if opinion in the halls of the Shamrock are any criterion.

Walter Doxsey made a great plea for his people to help the steel industry in the shellacking it is getting from probe committees.

Other speakers were: R. W. Hyde, treasurer, Carnegie-Illinois Steel Corp.; Lowell B. Mason, acting chairman, Federal Trade Commission; Capt. A. C. Ingersoll, Jr., president, Inland Waterways Corp.; M. O. Hjortland, The Steel Supply Co.; Harold B. Ressler, Joseph T. Ryerson & Son, Inc.; and Tom C. Campbell, Editor, THE IRON AGE.

Warehouse Officers

Houston — At the association's 41st annual meeting at The Shamrock here last week the following officers were elected:

Walter S. Doxsey was re-elected president and secretary.

W. H. Franklin, Edgcomb Steel Co., Philadelphia, and Wayne Rising, Ducommun Metals & Supply Co., Los Angeles, were named vice-presidents. Paul O. Grammer, Grammer, Dempsey & Hudson, Inc., Newark, N. J., was chosen treasurer.

L. B. Worthington, U. S. Steel Supply Co., Chicago, will serve as chairman of the executive committee.

Lester Brion, Peter A. Frasse & Co., Inc., New York; F. C. Flosi, A. M. Castle & Co., Chicago, and L. B. Worthington were re-elected directors-at-large to serve 3-year terms.

Marvin B. Marsh, Marsh Steel Corp., Kansas City, was elected director-at-large for a term expiring in 1951.

Viewing the News from

The ECONOMIC SIDE

By JOSEPH STAGG LAWRENCE

"Hands Across the Sea"

WE listened the other evening to Her Excellency, Vijaya Lakshmi Pandit, the charming Ambassador of India. She was speaking to The Economic Club in New York City. This vigorous representative of a new nation expounded a philosophy of international cooperation whose clear but adroit overtones we must not ignore. That is, if we want to keep our shirts.

Not since Keynesian antithrift and prodeficit dogma was first unfurled have we listened to anything with which we disagreed more completely. Or anything which presents a greater threat to national solvency and economic survival.

The lady from India laid on the line the theory that world wealth should be distributed more evenly among all nations. It was immoral and dangerous for our country to hold and enjoy the greater part of the world's goods. It was immoral because such great disparity in wealth did not accord with the principles of justice. It was dangerous because our great wealth would provoke the less fortunate and compel them ultimately to achieve by violence that equitable distribution which we failed to effect voluntarily.

A second theory which the gracious spokesman of the East presented was that wars were caused by hunger. Empty bellies were not likely long to respect legal titles that protected wasteful abundance in one country and insured starvation in another. The tension arising from a lack of food predisposed the world to war. In such a war the United States would be involved and might well have to bear the major burden and pay the heaviest price in blood, destruction, and social disorder.

This dual approach to the ills of the world leads to a clear and simple solution. Let this country share its wealth with other less fortunate nations. This will discharge a plain moral duty and will remove the causes of war. We shall assure ourselves a world leadership that will be not only material but spiritual as well.

This is not a new line. In the massive propaganda released on behalf of Point Four there has already appeared the doctrine of international communism, i.e., that our wealth must be divided with other nations. Similarly much of the softer-headed advocacy of foreign-aid-forever rests on the notion that we may avoid war in the future by feeding the hungry.

This calls for a little cold water. The wealth of nations does not depend upon the capricious favor of Providence in allocating basic natural resources. It depends upon the personal qualities of energy and courage; the social qualities of adequate incentive and competitive vigor; the political qualities of individual freedom, nondiscrimination, and limited intervention by the state. Particularly upon a respect for property, a tolerance for the material rewards of competence, and a refusal to confiscate by taxation or destroy by nationalization and government competition.

To comply with these conditions, however, limits the power of politicians and forecloses the temptation to use the wealth accumulated by others to bribe the masses in order to secure tenure and perpetuity in office. The redistribution of American wealth might seem a desirable solution to many aspiring statesmen not yet certain of their power.

If hunger is the invariable or major cause of war, it has eluded those objective historians who have given the problem their un-angled professional attention. The major threat of war today is posed by twelve men in the Kremlin, none of whom—so far as we can judge by the pictures—is suffering from a lack of calories.

Replacement Policy Asked At Westinghouse Machine Tool Forum

Warns of tool inadequacy by 1955 . . . Funds for research pushed.

Buffalo — Systematic replacement of machine tools is needed to pull out of the present trend toward obsoletion, said L. W. Scott Alter, president of the American Tool Works Co., at last week's Fourteenth Annual Machine Tool Electrification Forum held here by the Westinghouse Manufacturing Co. Representatives of 125 machine tool firms were among the 300 attending.

Advocates Replacement

An industrial research address by Dr. C. C. Furnas, director, Cornell Aeronautical Laboratory, mentioned unsolved questions in physics pertinent to the machine tool industry. Theme of the meeting was electrical problems of the machine tool industry.

Mr. Alter warned that by 1955 more than three out of four of American machine tools would be at least ten years old. His paper "What to Do About this Equipment Crisis" advocated a concrete replacement policy entailing periodic machine checks and market evaluation.

Dr. Furnas praised the recent American Society of Tool Engineers appropriation for research but noted that it was too small. He said that industry in general must raise research expenditures.

Papers Presented

Forum papers included a discussion of dc braking of ac induction motors by F. D. Snyder, of Westinghouse; "Electronic Devices as Components of Machine Tool Control" by J. M. Morgan, Jr., of the Cincinnati Milling Machine Co.; "How Carbide Tools Affect the Electrical Requirements of Machine Tools" by E. K. Morgan, of Giddings and Lewis Machine Tool Co.; and two discussions of a new approach to the use of constant cutting speeds, by R. C. Montanus of the Springfield Machine Tool Co., and E. B. Ankenmann of Westinghouse.

Assembly Costs Take a Tumble with Change-over to CLUTCH HEADS

Users Certify 15% to 50% Production Increases for Lower Final Costs

In view of this testimony you may confidently expect these exclusive time and cost-saving CLUTCH HEAD features to deliver a similar ratio of production increases on your assembly line . . . to lower your final costs by producing more for less.

Higher Visibility of the clutch recess eliminates operator hesitation. Even "green" help drives with speed and confidence. No "break-in" needed.

No Damaged Heads . . . Dead-center entry with the Center Pivot Column prevents driver canting, makes straight driving automatic, and checks out delay and expense fixing burred or chewed-up heads.

Now, Non-Tapered Driving that sends skid damage to zero; safeguarding manpower and material. With CLUTCH HEAD'S all-square driving engagement there is no need for end pressure to combat "ride-out" (as set up by tapered driving) and the drive home is effortless. This safety factor and elimination of fatigue steps up production.

One-Handed Reaching at "Bottlenecks." Only CLUTCH HEAD provides a frictional Lock-On that joins screw and bit as a unit to permit one-handed reaching into inner spots and driving from any angle.

214,000 Screws Driven Non-Stop. This is the record established by the rugged Type "A" Assembly Bit . . . continuous high torque driving on a main assembly line of one of America's largest automotive plants.

New Bit Life in 60 Seconds. Consider the added tool economy of simplified reconditioning this bit REPEATEDLY . . . by a 60-second application of the end surface to a grinding wheel.

Curing Field Service "Headaches." For simplified field service, CLUTCH HEAD alone has a recess that is basically designed for operation with a common screwdriver or with any flat blade which need only be reasonably accurate in width.

These advantages are fully detailed in the New CLUTCH HEAD Brochure . . . along with technical information your engineers and plant executives will want for reference. Start your investigation of CLUTCH HEAD'S potential savings for your assembly by sending for a copy . . . and indicate sizes and types of screws which interest you.

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STEEL CONSTRUCTION NEWS

New York — According to reports received by the American Institute of Steel Construction, Inc., the estimated total bookings of fabricated structural steel for March amounted to 187,949 tons; the highest reported since March, 1948 when 213,123 tons were booked. The current month shows an increase of 26 pct over March, 1949 and 64 pct over February 1950. For the first three months of the year the bookings total 421,113 tons as compared with 388,261 tons for the same months of 1949.

March shipments also gained. A total of 152,812 tons were reported as compared with 128,623 tons for February. The three months total for 1950, however, is some 14 pct less than for the corresponding period of 1949.

The backlog (tonnage available for future fabrication) for the next four months only, is 556,416 tons.

Following is the complete tabulation of bookings and shipments:

	Estimated Total Tonnage for the Entire Industry		
	1950	1949	Avg. 1936/1940
CONTRACTS CLOSED			
Jan.	118,423*	130,418	107,578
Feb.	114,741*	108,764	96,280
Mar.	187,949	149,079	124,558
Totals	421,113	388,261	328,416
SHIPMENTS			
Jan.	134,780*	152,746	92,578
Feb.	128,623*	145,879	88,626
Mar.	152,812	185,885	115,031
Totals	416,215	484,510	296,235
TONNAGE AVAILABLE FOR FABRICATION WITHIN THE NEXT FOUR MONTHS	556,416	582,466	313,635

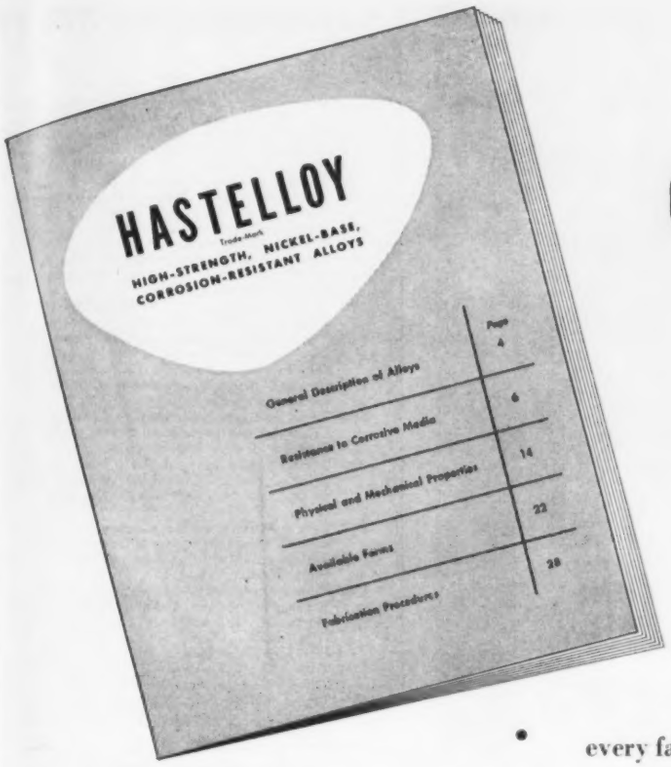
*Revised.

Fabricated steel awards this week included the following:

1938 Tons, Charlestown, Mass., Reconstruction of Sullivan Sq. through M. D. Mattee Construction Co., Quincy, Mass., to Lehigh Structural Steel Co., Allentown, Pa.

1545 Tons, Allegheny County, Pa., Plum Creek Viaduct, Pennsylvania Turnpike Authority—western extension, Bethlehem Steel Co., Bethlehem, low bidder.

1520 Tons, Allegheny County, Pa., Brush Creek Viaduct, Pennsylvania Turnpike Author-



Get the latest data on 4 ALLOYS to combat severe corrosion

Every designer . . . every engineer . . . and every fabricator who is faced with the problem of selecting a high-strength material that will withstand severe chemical corrosion should have a copy of this new 40-page booklet. It tells the story of the four HASTELLOY alloys—what they are, how they are fabricated, and how they can be used to combat severe corrosion.

HASTELLOY alloys are being used successfully in every branch of the chemical and allied industries . . . in the production of chemicals, petroleum, textiles, plastics, aircraft, and metals. To get the latest data on these versatile materials of construction, just fill out the handy coupon below for your free copy of the booklet, "HASTELLOY High-Strength, Nickel-Base, Corrosion-Resistant Alloys."

The trade-marks "Haynes" and "Hastelloy" distinguish products of Union Carbide and Carbon Corporation.

HERE'S WHAT'S IN IT

Description of the HASTELLOY Alloys—A brief summary of the chemical composition and physical properties of the four alloys: A, B, C, and D.

Resistance to Corrosion—Easy-to-read tables show the resistance of each of the HASTELLOY alloys to 8 common corrosive media.

Physical and Mechanical Properties—Four pages of tables give properties at room temperature and also at elevated and sub-zero temperatures. Graphs compare the properties of HASTELLOY alloys with those of other metals.

Available Forms—HASTELLOY alloys can be supplied as conventional and precision investment castings; hot-rolled bar stock, sheet, and plate; wire, tubing, and welding rod; also, pipe and fittings.

Fabricating Procedures—The proper procedures for welding, heat-treating, hot-working, cold-working, surface preparation, machining, and grinding the alloys are given.

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Steel Construction News

Continued

ity—western extension, Bethlehem Steel Co., Bethlehem, low bidder.

900 Tons, Charlestown, Mass., bridge, through Westcott Construction Co., Attleboro, Mass., to Groisser and Shlager Iron Works, Somerville, Mass.

825 Tons, Allegheny County, Pa., Willow Run Viaduct, Pennsylvania Turnpike Authority—western extension, Fort Pitt Bridge Works, Pittsburgh, low bidder.

600 Tons, Philadelphia, machine shop for Atlantic Refining Co., to Belmont Iron Works, Philadelphia.

590 Tons, Chicago, St. Peter's Church and Priary, to Hansel-Elcock Co., Chicago.

477 Tons, Mobile, Ala., machine room extension for Hollingsworth and Whitney Co., to Virginia Bridge Co., Birmingham, through Rust Engineering Co., Birmingham, contractor.

450 Tons, Indianapolis, Empire Life Insurance Co., building to Central States Bridge and Structural Co., Indianapolis.

412 Tons, Sacramento, Calif., Walnut Grove bridge, through Lord & Bishop, Sacramento, to Consolidated Western Steel Corp.

250 Tons, Attleboro, Mass., new junior high school, through Westcott Construction Co., Attleboro, Mass., to Groisser and Shlager Iron Works, Somerville, Mass.

142 Tons, Humphrey County, Tenn., Buffalo River Bridge, for Tennessee Highway Department, to Virginia Bridge Co., Birmingham, through J. B. Michael & Co., Memphis, contractor.

130 Tons, Cook County, Ill., bridge section 263-0707.2 to American Bridge Co.

116 Tons, Wilmington, Del., Newcastle Ave. overpass, to Conduit & Foundation Co., Philadelphia.

110 Tons, Taunton, Mass., new church, through Loranger Construction Co., Taunton, Mass., to Groisser and Shlager Iron Works, Somerville, Mass.

100 Tons, Chicago, Laramie Ave. grade separation, to Bethlehem Steel Corp.

Fabricated steel inquiries this week included the following:

4000 Tons, Wilton, N. D., Bureau of Reclamation P, Specification 2996, due June 1.

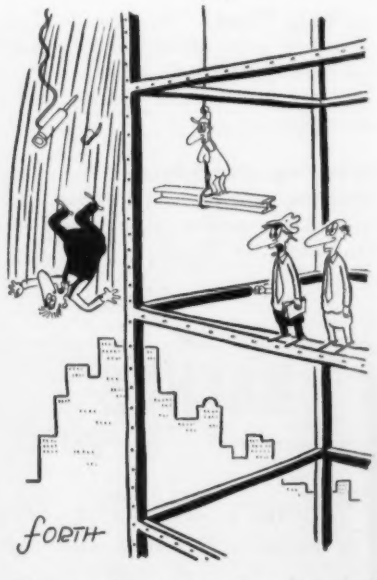
1241 Tons, Allegheny County, Pa. Construction of an I-beam bridge, concrete deck steel arch, continuous deck I-beam bridge, and continuous I-beam bridge. State Highway and Bridge Authority, Harrisburg, Pa. Bids to May 26.

1200 Tons, Allegheny County, Pa., State Highway & Bridge Authority, bridge, due May 26.

480 Tons, Denver, bridge No. U1-UG1-022/8.

470 Tons, Chicago, Halsted St. bridge. Due May 11.

225 Tons, Salem, Mass., steel and concrete bridge and two span reinforced concrete



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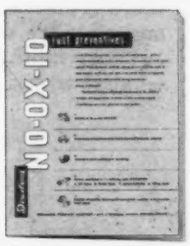

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Steel Construction News

Continued

box conduit and approaches and bypass, Charles A. Fritz, Beverly, Mass., district engineer. Completion date, Oct. 1, 1951.

200 Tons, Wilmington, Del., Pennsylvania Railroad overpass, due May 26.

190 Tons, Boulder City, Nebr., Bureau of Reclamation Specification No. 2990, bids due May 9.

Reinforcing bar awards this week included the following:

640 Tons, Coralville, Iowa, reservoir on Iowa River to Ceco Steel Products Co., Chicago.

380 Tons, Chicago, Wellington Ave. apts. to Olney J. Dean Steel Co., Chicago.

350 Tons, Williamsport, Pa., flood wall, to U. S. Steel Supply Co., Chicago.

330 Tons, Chicago, Canal St. Sub Piers, M. J. Boyle and Co., Chicago, low bidder.

330 Tons, Evanston, Ill., Hinman Ave., apt. building, to Joseph T. Ryerson and Son Co., Chicago.

315 Tons, Lakewood, Ohio, St. Edward's High School, to Builders Structural Co.

195 Tons, Cleveland, Wheeling and Lake Erie bridge, to Paterson Leitch.

155 Tons, Hamilton, Ohio, Harrison School, to Pollock Steel Co.

155 Tons, Akron, sewage plant, to Truscon Steel Co.

120 Tons, Chicago, Illinois Packing Co., to Joseph T. Ryerson and Son Co., Chicago.

100 Tons, Allegheny County, Pa., Dravosburgh Bridge, to U. S. Steel Supply Co., Chicago.

Reinforcing bar inquiries this week included the following:

11,000 Tons, Riverdale, N. D., Harrison dam and reservoir.

1500 Tons, Pittsburgh, Pa., apt. building.

750 Tons, New Albany, Ind., U. S. Engineers, flood control project.

680 Tons, Fort Madison, Iowa, office building.

341 Tons, Allegheny County, Pa. Construction of an I-beam bridge, concrete deck steel arch, continuous deck I-beam bridge, and continuous I-beam bridge. State Highway and Bridge Authority, Harrisburg, Pa. Bids to May 26.

330 Tons, Chicago, canal sub piers, M. J. Boyle and Co., Chicago, low bidder.

315 Tons, Cincinnati, water works improvements.

279 Tons, Los Angeles, bridge over Hollywood Freeway at Fountain Ave., California Div. of Highways, Los Angeles, bids to May 25.

250 Tons, Omaha, parking garage.

230 Tons, Chicago, processing plant of H. C. Christians Co.

177 Tons, Salem, Mass., steel and concrete bridge and two span reinforced concrete box conduit and approaches and bypass, Charles A. Fritz, Beverly, Mass., district engineer. Completion date, Oct. 1, 1951.

150 Tons, Lakewild, Ohio, Edgewater Tower Apts.

145 Tons, Chula Vista, Calif., bridges and approaches at Main St. and H St., California Div. of Highways, Los Angeles, bids to May 25.

110 Tons, Jasper, Ore., abutments and piers for steel RR bridge, Lookout Point reservoir, Portland District, Corps of Engineers, CIVENG-35-026-50-345, bids to June 2.

110 Tons, Joliet, Ill., high school stadium contract, Robert G. Regan Co.

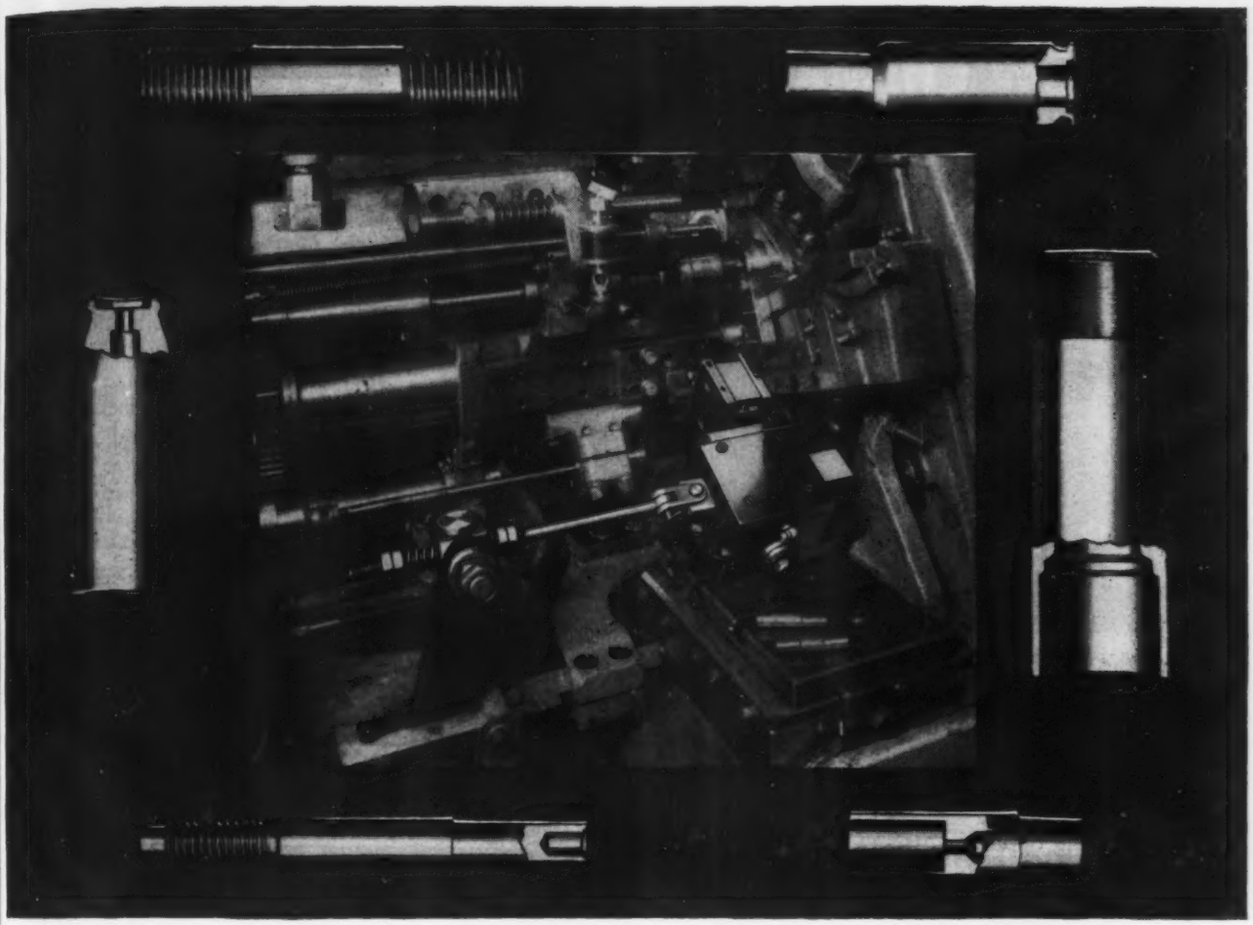
105 Tons, Alameda Co., Calif., highway construction between Livermore and Hopyard Rd., California Div. of Highways, Sacramento, bids to May 24.

Steel bearing piling inquiries this week included the following:

160 Tons, Walla Walla, Wash., steel H-section bearing piles for McNary lock and dam, Walla Walla District, Corps of Engineers, CIVENG-45-164-50-126, bids to May 10.

Steel plate inquiries this week included the following:

1000 Tons, Mechanicsburg, Pa., storage tank for Philadelphia Navy Yard, due May 23.



FINISH THIS DOUBLE OPERATION WORK *Faster!*

With the New National Acme Pick-Up and Transfer Attachment

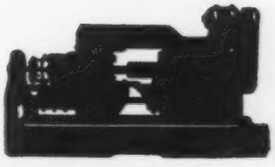
Here's a way to save machines, manpower and money.

The new National Acme Swinging Type Pick-Up and Transfer Attachment permits doing many second operation jobs on a first operation machine. *Think what that means:* fewer handlings, fewer machines, faster production—and less overhead, less floor space.

This special attachment—another example of how modern Acme-Gridley tooling methods give "*more good pieces in the pan*"—is available only as original equipment on bar machines of 9/16", 1" and 1¼" capacities.

With this new attachment you can finish both ends of a part in *one* double-indexing set-up. For example, the stud illustrated is completed in 9 seconds flat.

For additional examples of time-saving Acme-Gridley tooling methods, write for our new Bulletin TP-44.



ACME-GRIDLEY BAR and CHUCKING AUTOMATICS built in 4, 6 and 8 spindle styles, maintain accuracy at the highest spindle speeds and fastest feeds modern cutting tools can withstand.

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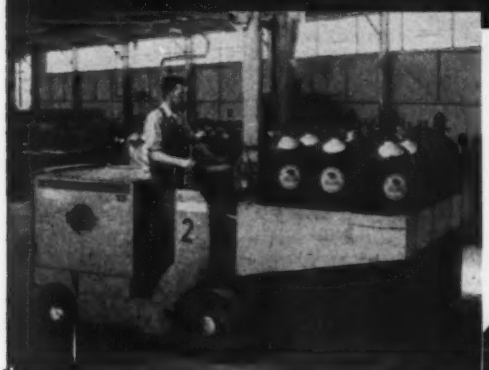
DOW CHEMICAL saves thousands of dollars annually with *BAKER TRUCKS*



Baker Fork Truck with Trayner-Reinhart cylinder carrier easily transports twelve 16" cylinders.

Bagged material, stacked on pallets as it comes from the line, is tiered to the ceiling in storage.

● At the Pittsburg, California, plant of The Dow Chemical Company, five Baker Fork Trucks expedite handling of material in production, storage and shipping departments.

Two of these trucks, one of them fitted with a Trayner-Reinhart cylinder carrier, transport 16" cylinders of ammonia—twelve at a time—from production to warehouse and from warehouse to shipment. Trucks load cylinders directly into boxcars, or onto highway trucks.

Cartons of finished chemical products are handled in pallet loads to save manual handling in transporting, storing, and car or truck loading.

The remaining trucks speed handling of chemical products in bags or cartons on pallets—taking them from production to storage, where they are high-tiered to conserve floor space, and from storage to shipment, where further man-hour savings are made in loading.

Prior to the installation of the Baker Trucks, material was transported manually and hand-stacked. Cylinders were rolled by hand, one at a time. The use of the trucks has resulted in savings of thousands of dollars annually over former methods.

BAKER INDUSTRIAL TRUCK DIVISION
of The Baker-Raulang Company
1227 WEST 80th STREET, CLEVELAND 2, OHIO
In Canada: Railway & Power Engineering Corp., Ltd.

Baker® INDUSTRIAL TRUCKS

FREE

PUBLICATIONS

Continued from Page 36

complete descriptions of single, double and triple reduction units, overhung load rating tables, dimensions and weights. A selection section tells how to select herringbone gear reducers, and gives examples. *DeLaval Steam Turbine Co. For more information, check No. 9 on the postcard on p. 37.*

Metal Cutting

Four new product folders feature Milford metal cutting Flexible and All-Hard Rezistor hack saw blades, and Profile and Wavy Set band saw blades. The folders, first of a series planned to help the consumer select the blades best suited to his requirements, contain application pictures, useful hints on metal cutting, and other information of general interest. *Henry G. Thompson & Son Co. For more information, check No. 10 on the postcard on p. 37.*

Safety Feeders

The Littell line of Pres-Vac safety feeders and mechanical pickers combine speed with safety for handling small parts on production punch presses, as described in a 4-p. folder. Also listed are some interesting statistics on costs of hand injuries to the employer. *F. J. Littell Machine Co. For more information, check No. 11 on the postcard on p. 37.*

Shear Knives

The Shear Knife Handbook is a 48-p. glossary of useful information for those who specify, use, buy or grind metal-cutting shear knives. *Heppenstall Co. For more information, check No. 12 on the postcard on p. 37.*

Gear Grinding

A new 4-p. bulletin describes and illustrates the Reishauer ZA tooth flank gear grinding machine for

grinding gears to close tolerances at high speeds. *Cosa Corp. For more information, check No.* 13 *on the postcard on p.* 37.

Plastic Finishing

Use of the Airless Wheelabrator in the mechanical finishing of plastics is described in a 4-p. folder showing how one user saves $100 thousand yearly. *American Wheelabrator & Equipment Corp. For more information, check No.* 14 *on the postcard on p.* 37.

Hole Positioning

The Coordinator, a semi-automatic hole positioning attachment for machine tools to control hole positioning for interchangeable parts with a minimum expenditure of time and money and maximum insurance against operator error, is described in a 4-p. folder. *Benzon Machine Co. For more information, check No.* 15 *on the postcard on p.* 37.

Flow Meters

Ratosleeve meters that permit plant-wide flow-measurement standardization at low cost are described in catalog. Suitable for liquids, gases, pulps and slurries, they handle flow rates from 2 to 6200 gpm and from 3 to 12,500 cfm. *Fischer & Porter Co. For more information, check No.* 16 *on the postcard on p.* 37.

Hobbing Machine

Construction and operating features, extra equipment and special tooling, and typical field applications are also presented in a new 12-p. catalog describing the Barber-Colman No. 1½ automatic hobbing machine for high speed, low cost production of spur gears, pinions and special tooth forms. *Barber-Colman Co. For more information, check No.* 17 *on the postcard on p.* 37.

Steel Tapes

Starrett precision steel tapes, levels, transits, and related tools and equipment are described and illustrated in a new 38-p. catalog also listing prices. *L. S. Starrett Co. For more information, check No.* 18 *on the postcard on p.* 37.

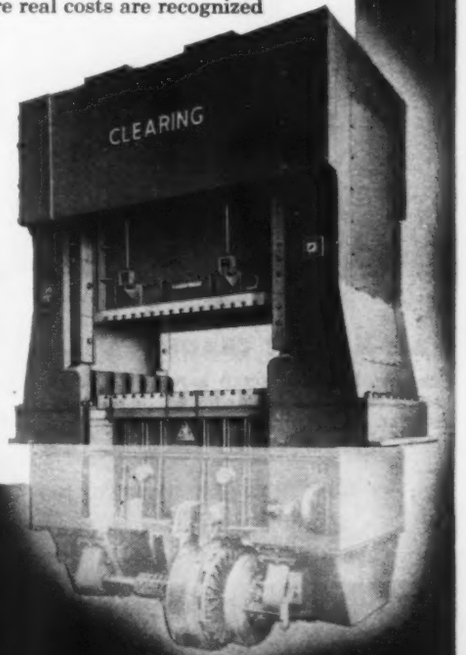
Resume Your Reading on Page 37

Just another horse?

Before a race the crowd identified him by number. Horses look pretty much alike. But everybody knew him at the finish line, because only once in his life did he fail to cross it first. *This* horse was Man o' War.

Presses look pretty much alike, too—in pictures. But in the shop, under production conditions, you can spot a Clearing press by the work it turns out and the steady way it keeps at it with minimum interruption for attention to either dies or press. That's why you'll find so many Clearings in plants where real costs are recognized and controlled.

It will pay you to discuss your metal-working problems with one of our sales engineers. Call or write without obligation.



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CLEARING MACHINE CORPORATION

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This one machine, operated by one man, gives you the fast, flexible, safe operation that pays big dividends in materials handling. You get more with P&H Added Value features. Write for literature, today.

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P&H Industrial Crawler Cranes Built in Models for all Yard Requirements

NEW

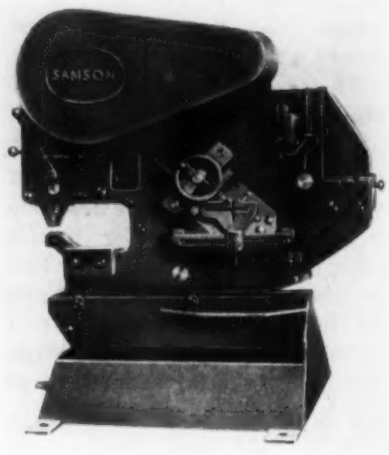
PRODUCTION IDEAS

Continued from Page 40

and a proportioning type potentiometer controller maintains the temperature at desired level. *Lanly Co. For more information, check No. 33 on the postcard on p. 37.*

Universal Fabricator

The Samson No. 10 universal fabricator performs many operations. The punch handles webs and flanges of beams, channels, columns, angles and flat stock. The shear cuts plates and sheets of any length



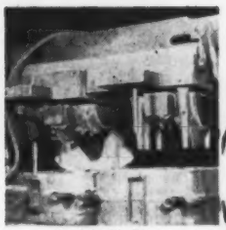
or width and trims angles. The bar cutter cuts rounds, squares, straight or 45° miter angles and T's. The coper notches a 90° V on angles and T's and copes structural shapes and plate. Throat depth of the machine is 12 in.; length of shear knives, 8 in.; 35 strokes per min. Standard equipment includes: two interchangeable die blocks for punching a wider range of shapes; one-shot lubrication; and a complete set of guards *Julius Blum & Co., Inc. For more information, check No. 34 on the postcard on p. 37.*

Drum Type Machine

Twelve holes and four surfaces are machined in a water pump body on a special drum type ma-

Planning

Pattern Making

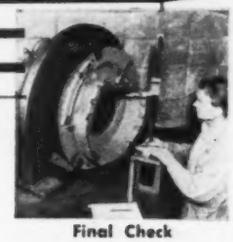


Mold Making

STEP-BY-STEP

Pouring

X-ray Inspection



Final Check

ECLIPSE-PIONEER *Foundries*

LEAD THE WAY TO BETTER CASTINGS

It is only natural that castings from the Eclipse-Pioneer Division Foundries are *better,* because every step in their manufacture is carried out by skilled craftsmen—each man an expert in his field and each field backed by more than 20 years experience. In addition to using the most modern machines, techniques and testing devices obtainable, the entire production line is conveyorized to assure rapid and economical service on all orders. If you plan to use aluminum and magnesium castings in your product, make it a point to consult Eclipse-Pioneer. Meanwhile, send for Eclipse-Pioneer's "Book of Facts."

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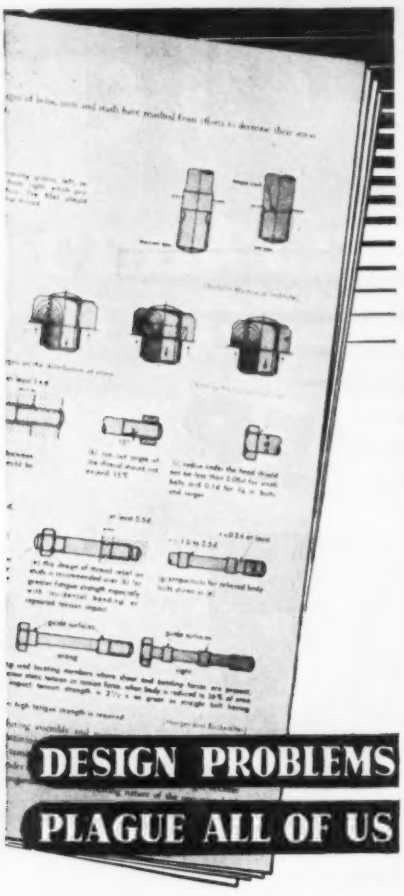
ECLIPSE-PIONEER DIVISION FOUNDRIES
BENDIX AVIATION CORPORATION
TETERBORO, N. J.

Bendix AVIATION CORPORATION



To serve well, a machine part—even when made of good steel, properly treated—must be properly designed.

A new 72 page booklet, sent free on request, discusses the vital relation between design, good steel and its satisfactory treatment.

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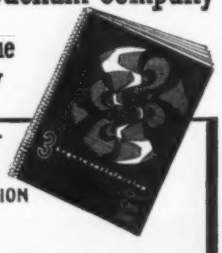

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chine that performs 22 operations by using two opposed hydraulic units with special heads and a 17-station 27-in. indexing drum. One head is arranged with 25 spindles and is powered by a 25

hp driving motor and a 3 hp hydraulic motor. A unit with 5 spindle heads is powered by a 15 hp driving motor and 2 hp hydraulic motor. Operations are drilling, reaming, facing, boring, chamfering and hollow milling and production exceeds 90 pieces per hr at 80 pct efficiency. Controls are interlocked to provide maximum safety. *Barnes Drill Co. For more information, check No. 35 on the postcard on p. 37.*

Pickup Truck

The ToteMaster Burden Carrier that will carry 2000 lb miscellaneous load, has 21 sq ft of loading

space, is powered by a 20 hp 4 cylinder high compression water cooled engine, and is governor-controlled for speeds up to 20 mph. Other standard specifications include an electric starter, hydraulic airplane type brakes, seat operated parking brake, T handle steering, pneumatic tires, and two wheel drive through automotive type differential. Three speeds forward, one reverse, save strain on engine,

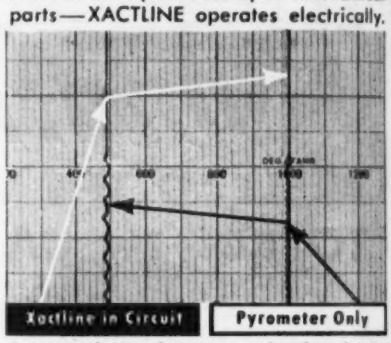
Turn to Page 134

Automatic
"STRAIGHT-LINE"
TEMPERATURE CONTROL
with
XACTLINE

ELIMINATE
Overshooting
Undershooting

Are you going to continue to put up with that troublesome overshooting and undershooting inherent in your conventional pyrometer control — especially when it is so easy to eliminate that saw-tooth effect?

Put XACTLINE in the control circuit. XACTLINE anticipates the temperature changes — before they occur. And too, it nullifies the varying amounts of thermal lag, residual heat, and mechanical lag — producing a short on-off cycle resulting in "Straight-Line" temperature control. This performance is possible because there is no dependence upon mechanical parts — XACTLINE operates electrically.



Exact reproduction of temperature chart for a heating process showing the comparison of the "Straight-Line" temperature control produced by XACTLINE and the saw-tooth curve obtained with only conventional control.

XACTLINE is applicable to any indicating or recording pyrometer control of the millivoltmeter or potentiometer type. It should be used wherever close temperature control is required — any type of electrically heated oven, furnace, kiln, injection molding machine, and fuel-fired furnaces equipped with motor-operated or solenoid valves.

XACTLINE is a complete unit. No adjustment or coordination with the control instrument is required regardless of the size of the furnace, length of the heating cycle, or size of the load. Installation is very simple — can be either flush or surface mounted.

PRICE $89.50 F.O.B. CHICAGO

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LOW COST SYNCHRONIZED AUTOMATIC SHEAR LINES

THE installation of a Wean-Hallden Synchronized Automatic Shear Line assures you the most efficient shearing operation available today. The Wean-Hallden, while actually requiring *less floor space*, delivers up to *twice the production*. Infinite variable lengths from 12-inches to 12-feet at speeds up to 200 FPM with accuracy better than commercial tolerances means faster production, reduced labor costs and minimum scrap loss for you. *Before You Buy—Investigate Wean-Hallden.*

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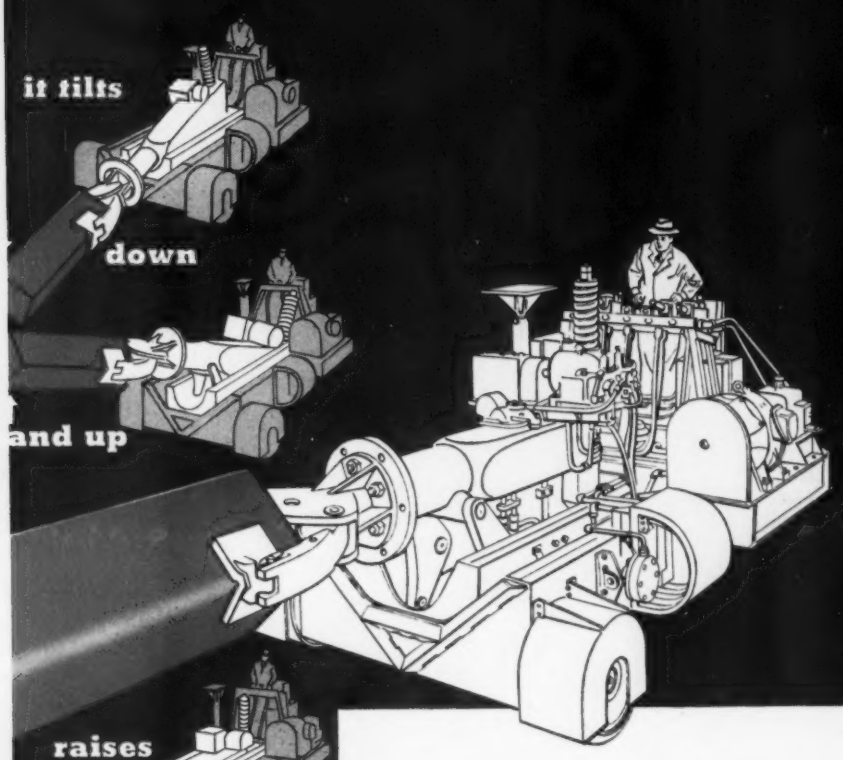
agile*



*Amazingly enough, you'll find *agile* an apt description of the massive Brosius Auto Floor Manipulator at work on your forging floor. With swift agility it draws or charges — turns on a dime and moves with independent facility — manipulates the billet or blank with remarkably sensitive movements. And each unit possesses the inherent sturdiness and sensible simplicity so typical of Brosius products. Brosius manipulators will bring to your forge shop added speed, added safety, added economy — you should be using them. Write for literature.

Edgar E. BROSIUS Company Inc.

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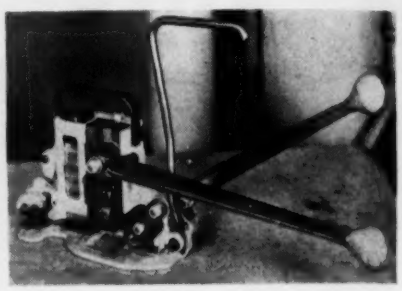
and increase grade performance with heavy loads. *Lewis Shepard Products, Inc. For more information, check No.* 36 *on the postcard on p.* 37.

Seal Feed Tool

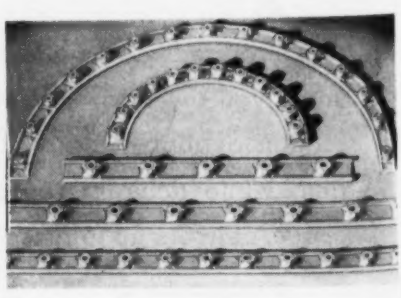
Built for ¾ in. strapping and weighing 15 lb, a new automatic seal feed tool tensions and cuts the strapping in smooth, continuous sequence, automatically feeds the



seal and crimps it to complete the operation. The seal magazine, designed for quick loading, holds a clip of 75 seals. The tool can be released at any point in its operating cycle to relocate the strap. *Signode Steel Strapping Co. For more information, check No.* 37 *on the postcard on p.* 37.

Gang Channel Nut Strip

A new gang channel nut strip, to provide permanent fasteners for applications subject to repeated on-off usage, simplifies time-saving multi-unit nut installations. Blue anodized for easy identification, the



channel strip is made of high strength 24S-T4 aluminum alloy. A new method of cut and raised dimpling retains the nuts securely and prevents over-riding. A nylon locking insert in each nut assures

A GROUNDED 200 hp motor recently put a large press out of commission for a midwest steel-tank firm. Dietz Electric, A-C Certified Service Shop, picked up the motor Saturday a.m. The stator was rewound and the motor back on the press in 36 hours — with no lost production time!

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These independent shops are hand-picked for fine workmanship, high business standards, and excellent facilities. Their work meets factory-established standards.

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Denver—Baker Electric Company

CONNECTICUT
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Waterbury—Elec. Motor Repair Co.

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New Orleans—Industrial Electric
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MAINE
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MARYLAND
Baltimore—Keystone Elec. Co., Inc.

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Roslindale—Ranney Electric Motors
Springfield—Elec. Motor Repair Co.

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Grand Rapids—Grand Rapids Ind. Co.
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MINNESOTA
Duluth—Mielke Electric Works, Inc.
Minneapolis—Parsons Electric Co.

MISSISSIPPI
Vicksburg—Ludke Electric Company

MISSOURI
Kansas City—Boese-Hilburn Elec. Co.
St. Louis—French-Gerleman Elec. Co.

NEBRASKA
Omaha—Omaha Electrical Works

NEW JERSEY
Atlantic City—Charles A. Buckley
Paterson—Elec. Service Repair Co.
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NEW MEXICO
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NEW YORK
Buffalo—Robertson Electric Co., Inc.
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Watertown—Watertown Electrics, Inc.

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PAID FOR ITSELF IN 2 YEARS

wheelabrator tumblast saves...

$5.00 Per Ton Cleaning Bolts 1/2" and Under

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$1.50 Per Ton Cleaning Bolts 7/8" and Over

At St. Louis Screw & Bolt Co., St. Louis, Missouri

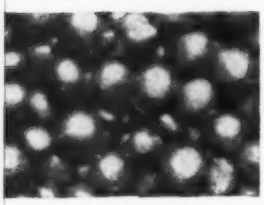
Through a direct saving of $1.50 to $5.00 per ton in the cost of removing scale from hot forged bolts, this Wheelabrator Tumblast repaid its entire cost in approximately two years time. Wheelabrating reduced acid pickling requirements at St. Louis Screw & Bolt Co. and immeasurably simplified the cleaning operations. Only those pieces which due to their size or nature cannot be Wheelabrated are now pickled. This results in lower operating costs by decreasing cleaning and handling time.

Forgings are cleaner, making plating and galvanizing easier and more durable without the necessity of subsequent surface treatment. 300 pound loads are throughly cleaned in four minutes — a fraction of the time formerly required by pickling.

You can compare your present cleaning methods with Wheelabrating without cost or obligation. Just send samples of your work to American Wheelabrator's testing laboratory and make them prove the cost-reducing advantages of Wheelabrator cleaning. Write today for full information.

tru-steel saves 79%

FOR CASTING SERVICE COMPANY



TRU-STEEL

No. 230 at Mag. 10X After 1500 Passes

SAVES Storage Space, Transportation Costs, Machine Maintenance, Loading Time, Replacement Parts.

A test was conducted for a period of 69 wheel hours at Casting Service Company, LaPorte, Indiana with the following results. Only 7.14 lbs. of **TRU-STEEL** Shot was used per hour to do the work of 34.7 lbs. of chilled iron. Nearly a ton less **TRU-STEEL** was used in the 69 hours making large savings in initial cost as well as handling, storage and transportation costs. Order a supply of **TRU-STEEL** today.

American

WHEELABRATOR & EQUIPMENT CORP.

510 S. Byrkit St., Mishawaka 3, Ind.

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

reuseability for more than 100 applications. A nylon red elastic locking collar protects fastenings against vibration, impact, and shock. It keeps bolt and nut threads rust-free and seals against liquid seepage. *Elastic Stop Nut Corp. For more information, check No. 38 on the postcard on p. 37.*

Heavy Duty Lift Trucks

A new series of heavy duty Liftruks in 5, 7½ and 10-ton capacities, have dual pneumatic traction tires mounted on an axle that supports the chassis and fork load, relieving the differential drive from this severe service. Lifting and tilting hydraulic units are oversize, operating at moderate low fluid pressure. The lifting guides

are interlocked with each other to provide perfect alignment and equal distribution of the fork loads on them. Improved vision for the operator has been accomplished. Liberal ground clearance has been provided. Attachments available include shovels, forks and fork extensions, power spreaders, rotary aprons for forks and special winches and crane booms. *Silent Hoist & Crane Co. For more information, check No. 39 on the postcard on p. 37.*

Salt Bath Furnace

Submerged electrodes feature the improved Hultgren salt bath furnace recommended for use with salt baths operating at temperatures from 1700 to 2400°F and for exceptionally deep baths. Elec-

11 ways to CUT Grinding Costs!

B&D Bench, Portable and Die Grinders give you MORE OUTPUT...

4 ***B&D PORTABLE GRINDERS*** *bring the tool to the work for grinding, cleaning, buffing, wire brushing. 3" to 6" wheel diam. Splined gear mountings, steel inserts for bearings, welded steel wheel guards.*

Per MAN Every Black & Decker grinding tool is designed to help your men work faster, with less fatigue, to cut your labor costs! B&D Portable Grinders are perfectly balanced, make it easy to bring the tool to the work. B&D Die Grinders have the lightweight so necessary for precision work. B&D Bench Grinders give more working clearance, better tool sharpening support from adjustable tool rests.

Per HOUR Famous B&D-built motors, tailor-made for the tools they drive, give these Grinders an unfailing source of power for uninterrupted production. Result: more work per hour, *every* hour!

Per TOOL Tough, longer-wearing parts give these B&D Grinders extra stamina for long years of service. Housings are extra husky to withstand hard use. B&D quality construction throughout!

WRITE TODAY for free, detailed catalog to: The Black & Decker Mfg. Co., 651 Pennsylvania Ave., Towson 4, Md.

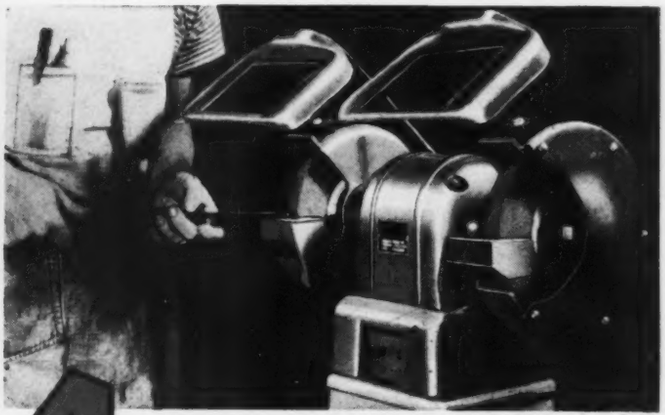
For Expert Help in CUTTING COSTS . . . See your Black & Decker Distributor for an experienced survey of your shop. He'll show you how you can save time and money.

LEADING DISTRIBUTORS EVERYWHERE SELL

Black & Decker

PORTABLE ELECTRIC TOOLS

3 ***B&D DIE GRINDERS*** *drive a variety of shaped wheels and burrs for high-speed precision work and grinding in hard-to-reach spots. 2", 2½", 3" wheel sizes . . . 16,000-19,000, R.P.M. spindle speeds.*



4 ***B&D BENCH GRINDERS*** *6" to 10" wheel diam., for sharpening, grinding, wire brushing, buffing. Models from ¼ to 1 H.P. with powerful "constant speed" motors built by Black & Decker. Completely modern design.*

PAGE WIRE

LOW CARBON
HIGH CARBON
STAINLESS
SPECIAL ALLOY
ARMCO IRON

ROUND
FLAT
OR
SHAPED

You draw the Shape
—Page can draw the Wire

—the way you want it for your production—whether it's ALL of your product, or only a part.

Cross-sectional areas up to .250" square; widths to ⅜"; width-to-thickness ratio not exceeding 6 to 1.

for Wire or Information about Wire—

Get in touch with Page!

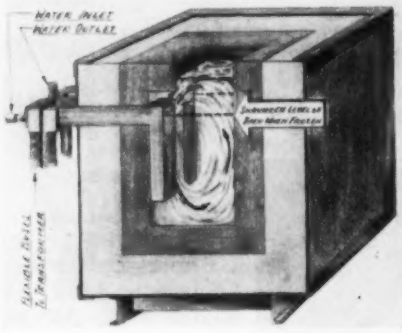
ACCO

Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles, New York, Pittsburgh, Philadelphia, Portland, San Francisco, Bridgeport, Conn.

PAGE STEEL AND WIRE DIVISION
AMERICAN CHAIN & CABLE

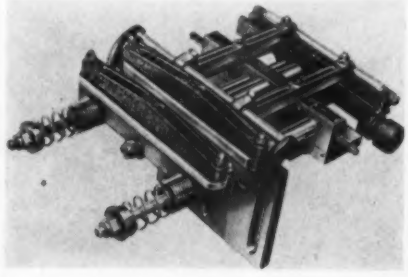
NEW PRODUCTION IDEAS
Continued

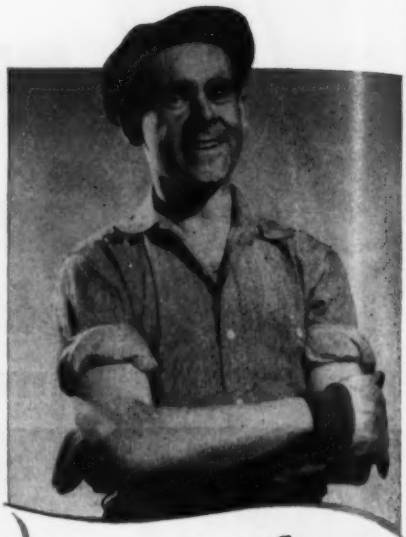
trodes enter through the back wall of the furnace just below the surface of the bath. They are closely spaced to produce electrodynamic stirring action, assuring rapid heating and temperature uniformity within 5°F. The submerged electrodes are so positioned that should the bath freeze from any cause, the salt will shrink sufficiently to expose the electrodes for restarting in a manner similar to the standard Ajax furnace. *Ajax Electric Co. For more information, check No. 40 on the postcard on p. 37.*



Automatic Stock Feed

All movements of the improved Feedmaster automatic air feed operate pneumatically; an air actuated feed head pulls the material through the machine and a hold head, also actuated by air, holds the material while the feed head returns to reload position. Gripping capacity has been increased by 50 pct. Springs added on the bar supports now absorb shock load, improving overall machine life. The hold head is securely clamped to the bar supports. The Feedmaster operates at 200 strokes per min, feeding coiled or strip stock up to





"Who said Clancy lowered the boom?"

"He didn't—because the boom broke! And I was on the gang in the Levinson shop that fixed it."

We got the call from Jones & Laughlin Steel Corporation at 4 p.m. on a Friday not long ago, just thirty minutes before the week-end shut-down. Immediate arrangements were made for shear-men, crane-men, welders, warehousemen and so on, who worked continuously Saturday and Sunday. *And the boom was back in service ready to use* when the first shift reported Monday morning.

Yes, that's another idea of the way we interpret the word SERVICE in our organization!

On Hand Always:

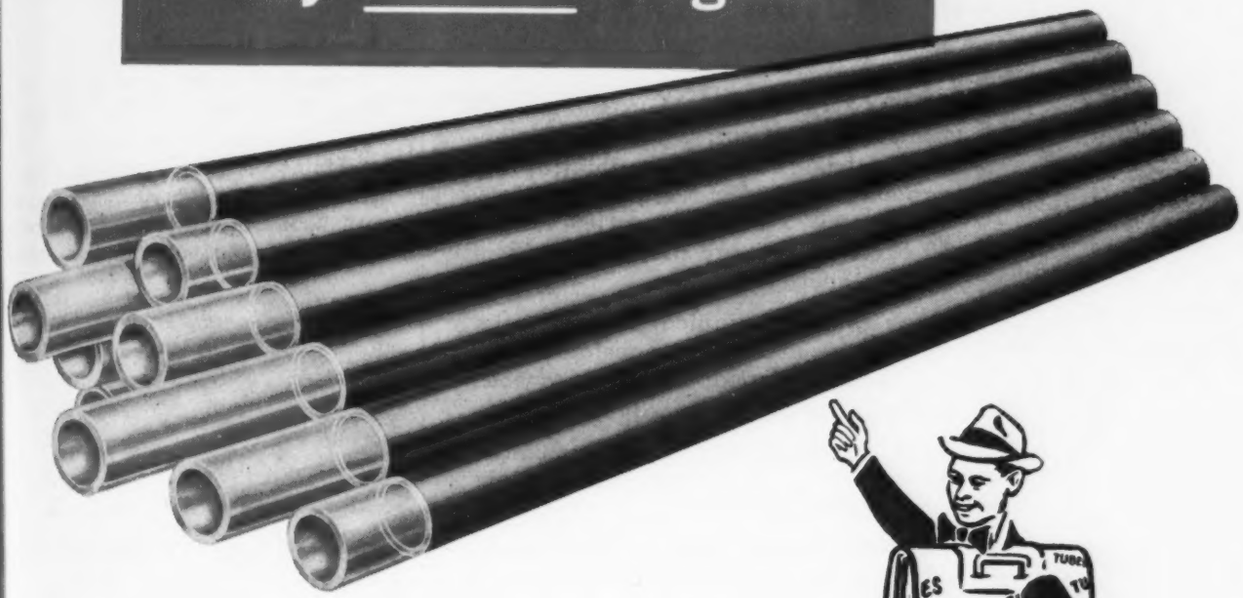
THE MATERIAL . . . THE FACILITIES . . . THE DETERMINATION . . . THE "KNOW-HOW" . . . TO DO YOUR JOB HOW YOU WANT IT WHEN YOU WANT IT.

LS-4

The Levinson STEEL COMPANY

PITTSBURGH, PA.

. . . might pay you to buy random lengths



Ask a B&W Tube Representative

. . . he knows

Perhaps you are *unnecessarily* exacting in the specification of length on your mechanical tubing orders. Is the added expense justified by end-use and manufacturing methods?

FOR EXAMPLE:

If your product and production methods permit, you can save up to 5% by ordering select random lengths of B&W seamless or welded mechanical tubing . . . 3½% on multiple random lengths. B&W Tube representatives, factory trained in "tube-technics", can often help you uncover economies in the purchase and application of B&W mechanical tubing.

B&W SEAMLESS and WELDED TUBES

THE BABCOCK & WILCOX TUBE COMPANY

General Offices: Beaver Falls, Pa.

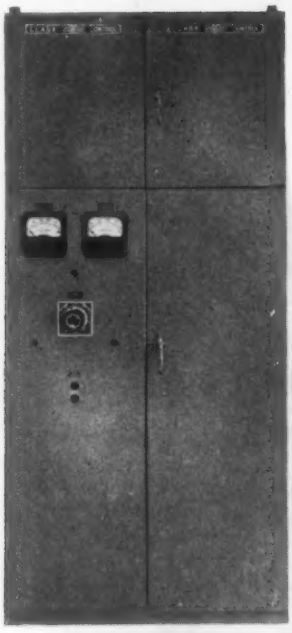
Plants: Alliance, Ohio, and Beaver Falls, Pa.

Sales Offices: Alliance, Ohio • Beaver Falls, Pa. • Boston 16, Mass. • Chicago 3, Ill. • Cleveland 14, Ohio • Denver 2, Colorado • Detroit 26, Mich. • Houston 2, Texas • Los Angeles 15, Calif. • New York 16, N. Y. • Philadelphia 2, Pa. • St. Louis 1, Mo. • San Francisco 3, Calif. • Syracuse 2, N. Y. • Toronto, Ontario • Tulsa 3, Okla. • Vancouver, British Columbia

1A-1565M

Contact CLARK...

for HIGH INTERRUPTING CAPACITY HIGH VOLTAGE MOTOR STARTERS!



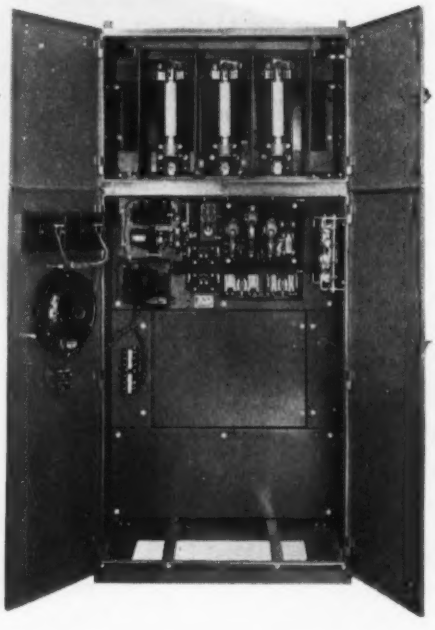
CLARK Synchronous Motor Starters, oil immersed, have current-limiting disconnecting type fuses with an interrupting capacity of 150,000 KVA at 2300 V, 60 cycles, and 250,000 KVA at 4160/4600 V, 60 cycles. They are also available at other frequencies.

There is no mechanical linkage—the direct-acting line contactor operates under oil. Thermal overload and instantaneous undervoltage protection is provided.

Single hand operation on permanent tank elevator, and a float-type oil gauge provide easy inspection.

In operation, the motor is started as an across-the-line squirrel cage motor, and accelerates to synchronizing speed with full voltage on the stator winding. The Polarized Field Frequency Relay assures complete and accurate synchronizing of the motor. This relay is constructed to provide field removal in case the motor is pulled out of step, and automatically re-applies the field if motor returns to synchronizing speed within a predetermined time.

A Potential Transformer provides 220 V control circuit, and there are no exposed low voltage control wires in the high voltage compartment.



Other CLARK synchronous motor starters are available with Dynamic Braking, in Reversing, Non-reversing, full voltage and reduced voltage types.

Consult our nearest District Office or Agency for details.

THE CLARK CONTROLLER CO.

ENGINEERED ELECTRICAL CONTROL • 1146 EAST 152ND STREET, CLEVELAND 10, OHIO

18 in. wide and up to a 12-in. stroke. The Feedmaster can be used with plain, compound, or progressive dies. *Great Western Tools, Inc. For more information, check No. 41 on the postcard on p. 37.*

Checking Recorder

Permanent chart records of involute tooth forms, tooth spacing, leads, contours, thread forms, can be obtained on the improved automatic checking recorder. Up to ±0.002 in. of error can be recorded automatically across the

chart of the instrument. Improvements are a selective two-speed chart drive and a new standardized interchangeable precision electronic gagehead. The head mounts in tandem with the indicator on a checker. Accuracy has been improved by the all-electric two-speed drive and improved pen mechanism. *Michigan Tool Co. For more information, check No. 42 on the postcard on p. 37.*

Paper Tape

A self-adhesive printed paper tape, processed in rolls, can be used in the same way and in the same container as cellulose tapes. Paper tape costs less and can be used where the superior appearance and performance of the cellulose or acetate tape are not required. *Topflight Tape Co. For more information, check No. 43 on the postcard on p. 37.*

Resume Your Reading on Page 41

MARKET

Briefs and Bulletins

state of stainless—Business in the stainless steel industry is described by producers with many adjectives all adding up to "phenomenal." Allegheny Ludlum is booked solid through August and could fill its order book through the third quarter. The field is opening up new outlets and still getting the old trade. Sizeable tonnages are going to the West Coast where a hub cap maker is using several hundred tons per month and crying for more. Railroad cars and trucks are also drawing their share.

news of J & L—Ben Moreell, president of the Jones & Laughlin Steel Corp., told at a recent press conference that his firm's modernization program will cost about $273 million by 1952, that a new continuous weld mill for small diameter pipe will be built at the Aliquippa, Pa., plant, and that J & L bought two electrolytic tinning lines from the Reconstruction Finance Corp. He also said that ground will be broken soon for the new 1 million ton open hearth shop at the South Side plant.

port needed—Portland, Ore., needs unloading and loading facilities for 4 million tons of inbound shipments to electro-process industries in the lower Columbia River area in 1960 to 1970, said Ivan Bloch, port consultant. He predicted major growth for those industries relying on low-cost power and pointed out that a goodly portion of metals and chemicals can be made only in electric furnaces and electric cells.

open door policy—The cost-cutting consciousness of industry and the difficulties it encounters will open the door to increased sales for the machine tool field, said David Ayr, president of the National Machine Tool Builders' Assn., at the May 4 NMTBA meeting in Chicago. He said that industry must turn to the machine tool people in its striving to reduce costs.

sooner than seen — Reports from the site indicate that the U. S. Steel Corp. eastern mill construction may get started sooner than expected. Occupants of riverfront property have been asked to vacate by mid-summer. Other tenants are given till the end of the year. A 500 homes project will be started soon for workers.

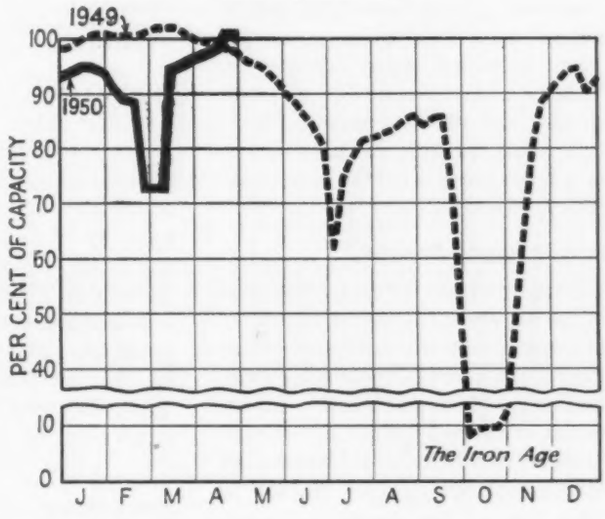
full blast—With current demand for ingots sprinting ahead of supply on the West Coast, the Geneva Steel Co. was operating at 103 pct of rated capacity last week.

left wing broken—The CIO International Union of Electrical Workers wrested bargaining rights for nearly 28,000 employees of the Westinghouse Electric Corp., Pittsburgh, from the left-wing United Electrical Workers. The matter was put to a vote by the National Labor Relations Board. A run-off election may be held to decide the bargaining rights for an additional 13,000 workers at the firm's East Pittsburgh plant. After ballots were counted only 100 votes separated the unions.

foreign pig—Imported pig iron can now be had at lower prices. Some offerings of foreign foundry iron now being made at prices as low as $38 c.i.f. eastern ports, duty paid. There is not as much red tape required to buy foreign iron now, and some jobbing foundries are putting in a stock.

below domestic—Foreign ferromanganese is coming in at a rate estimated by one observer at 1500 to 2000 tons a month. France has been the heaviest supplier. The most recent shipment was 5000 tons enroute to New Orleans. Prices range from $10 to $20 a ton below the domestic product.

Steel Operations



District Operating Rates—Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
April 23	103.5*	105.0*	92.0*	84.0	100.5*	104.0	104.0	104.0	101.0*	99.0	92.0	78.0	106.0	100.5*
April 30	102.0	104.5	91.0	84.0	94.5	104.0	104.0	104.0	100.0	100.0	89.0	82.0	91.5	100.5

* Revised.

Nonferrous Metals OUTLOOK

Market Activities

by John Anthony

Metal markets on the upgrade . . . Zinc and lead prices advance . . . June copper sold out . . . Try to pass mine subsidies again . . . Tin prices hold steady.

New York—The current market in metals involves heavy buying, inventory building, growing demand from abroad, and consequent price rises—just the reverse of the situation a year ago when confidence was lacking and buyers were reducing their inventories. Last week the second ¼¢ advance in the lead price occurred. Early this week, the fifth advance in zinc in a month and a half was put into effect, ¼¢ rise.

June Copper Scarce

Copper buying is very brisk. But some buyers have found that they are unable to get any more tonnage than already booked for June delivery. The industry's inventories of refined copper are at rock bottom, 60,000 tons at the end of March, and there is no margin to take care of the unusually heavy demand. The renewal of copper buying for the stockpile has also added fuel to the buying fire. There is in this situation the grounds for another price advance. Copper scrap is scarce, but refiners are holding to the 16¢ price. They can't get very much at this price, and reports indicate that other factors are buying scrap at a higher price.

Zinc demand continues to respond to the current high rate of industrial activity and the pressure of the rising market. Fair tonnages of slab zinc from abroad have been absorbed into the market without retarding the upward price movement. About 3500 tons of Belgian zinc were sold on an f.o.b. Antwerp basis at 9.50¢, the equivalent of 11¢ here.

NONFERROUS METALS PRICES

	Apr. 26	Apr. 27	Apr. 28	Apr. 29	May 1	May 2
Copper, electro, Conn.	19.50	19.50	19.50	19.50	19.50	19.50
Copper, Lake, Conn.	19.625	19.625	19.625	19.625	19.625	19.625
Tin, Straits, New York	76.50	76.50	77.00	....	76.50	*76.50
Zinc, East St. Louis	11.00	11.00	11.00	11.00	11.25	11.25
Lead, St. Louis	10.80	10.80	10.80	10.80	10.80	10.80

Note: Quotations are going prices.
* Tentative.

MONTHLY AVERAGE PRICES

The average prices of the major nonferrous metals in April based on quotations appearing in THE IRON AGE, were as follows:

	Cents Per Pound
Electrolytic copper, Conn. Valley	18.94
Lake Copper, Conn. Valley	19.065
Straits tin, New York	76.379
Zinc, East St. Louis	10.69
Zinc, New York	11.41
Lead, St. Louis	10.43
Lead, New York	10.63

Mine subsidy legislation will have another chance in this session of Congress. Rep. John Bennett (Mich.) has introduced a measure providing for $60 million the first year and $90 million in each of the following years. A more modest measure than previous bills, it has some chance of enactment, provided it can be pushed through the House Rules Committee.

Lead demand fell off some after the heavy volume leading to the price advances. The market is still fairly active and producers are selling the intake.

There has been very little change in the tin market. There is a lack of spot and prompt metal here, but this will change with the arrival of British Ministry tin now afloat and due May 7. The backwardation had increased to ⅞¢ by early this week.

MILL PRODUCTS

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 26.9¢; 4S, 61S-O, 28.8¢; 52S, 30.9¢; 24S-O, 24S-OAL, 29.8¢; 75S-O, 75S-OAL, 36.3¢; 0.081 in., 2S, 3S, 27.9¢; 4S, 61S-O, 30.2¢; 52S, 32.3¢; 24S-O, 24S-OAL, 30.9¢; 75S-O, 75S-OAL, 38¢; 0.032 in., 2S, 3S, 29.5¢; 4S, 61S-O, 33.5¢; 52S, 36.2¢; 24S-O, 24S-OAL, 37.9¢; 75S-O, 75S-OAL, 47.6¢.

Plate: ¼ in., and heavier: 2S, 3S, F, 23.8¢; 4S-F, 26¢; 52S-F, 27.1¢; 61S-O, 26.6¢; 24S-F, 24S-FAL, 27.1¢; 75S-F, 75S-FAL, 33.9¢.

Extruded Solid Shapes: Shape factors 1 to 4, 33.6¢ to 64¢; 11 to 13, 34.6¢ to 76¢; 23 to 25, 36.7¢ to $1.05; 35 to 37, 44¢ to $1.53; 47 to 49, 63.5¢ to $2.20.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 24¢ to 30.5¢; Cold-finished, 0.375 to 3 in., 2S, 3S, 36.5¢ to 32¢.

Screw Machine Stock: Rounds, 11S-T3, R317-T4: ⅛ to 11/32 in., 49¢ to 38¢; ⅜ to 1½ in., 37.5¢ to 35.5¢; 1 9/16 to 3 in., 35.5¢ to 32.5¢; 17S-T4 lower by 1¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.: 2S, 36¢ to 26.5¢; 52S, 44¢ to 32¢; 56S, 47¢ to 38.5¢; 17S-T4, 50¢ to 34.5¢; 61S-T4, 44.5¢ to 34¢; 75-T-6, 76¢ to 55¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed)

Sheets and Plate: Ma, FSa, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.311, 58¢; ½ to ¾, 46¢; 1¼ to 1.749, 43¢; 2½ to 5, 41¢. Other alloys higher. Base: Up to ¾ in. diam., 10,000 lb; ¾ in. to 1¾ in., 20,000 lb; 1¾ in. and larger, 30,000 lb.

Extruded Square, Hex. Bar: M, size across flats, in., ¼ to 0.311, 61¢; ½ to 0.749, 48¢; 1¼ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher. Base: Up to ¾ in. diam, 10,000 lb; ¾ in. to 1¾ in., 20,000 lb; 1¾ in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangle: M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb per ft, per. up to 3.5 in., 55¢ 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 43¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ lb to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam. in., 0.049 to 0.057, ¼ to 5/16, $1.14; 5/16 to ⅜, $1.02; ½ to ⅝, 76¢; 1 to 2 in., 65¢; 0.065 to 0.082, ⅜ to 7/16, 85¢; ⅝ to ¾, 62¢; 1 to 2 in., 57¢; 0.165 to 0.219, ⅝ to ¾, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher. Base, OD in in.,: Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Nickel and Monel

(Base prices, cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	66	50
Rods and bars	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks	..	40

Copper, Brass, Bronze

(Cents per lb, freight prepaid on 200 lb)

	Sheets	Rods	Extruded Shapes
Copper	33.18	....	32.78
Copper, h-r	....	29.03	....
Copper, drawn	....	30.28	....
Low brass	31.07	30.76	....
Yellow brass	29.61	29.30	....
Red brass	31.56	31.25	....
Naval brass	34.26	28.32	29.58
Leaded brass	....	23.99	28.02
Com'l bronze	32.58	32.27	....
Manganese bronze	37.76	31.66	33.22
Phosphor bronze	50.90	51.15	....
Muntz metal	32.48	28.04	29.29
Everdur, Herculoy, Olympic, etc.	37.93	36.87	....
Nickel silver 10 pct	40.51	42.69	47.46
Arch. bronze	....	....	28.02

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed	17.00
Aluminum pig	16.00
Antimony, American, Laredo, Tex.	24.50
Beryllium copper, 3.75-4.25% Be dollars per lb contained Be	$24.50
Beryllium aluminum 5% Be, dollars per lb contained Be	$56.00
Bismuth, ton lots	$2.00
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$1.80 to $1.87
Copper, electro, Conn. Valley	19.50
Copper, lake, Conn. Valley	19.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$100 to $110
Lead, St. Louis	10.80
Lead, New York	11.00
Magnesium, 99.8+%, f.o.b. Freeport Tex., 10,000 lb	20.50
Magnesium, sticks, 100 to 500 lb	36¢ to 38¢
Mercury, dollars per 76-lb flask f.o.b. New York	$70 to $73
Nickel, electro, f.o.b. New York	42.97
Nickel oxide sinter, f.o.b. copper Cliff, Ont., contained nickel	36.25
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$66 to $69
Silver, New York, cents per oz.	71.75
Tin, New York	76.50
Zinc, East St. Louis	11.25
Zinc, New York	11.97
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	17.75-18.25
No. 120	17.25-18.25
No. 123	16.75-17.75
80-10-10 ingot	
No. 305	22.25
No. 315	20.25
88-10-2 ingot	
No. 210	28.25
No. 215	25.75
No. 245	19.25-21.50
Yellow ingot	
No. 405	15.00-16.50
Manganese bronze	
No. 421	21.25

Aluminum Ingot

(Cents per lb, of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	18.25-18.75
0.60 copper, max.	18.00-18.50
Piston alloys (No 122 type)	16.50-17.00
No. 12 alum. (No. 2 grade)	16.00-16.50
108 alloy	16.50-17.00
195 alloy	17.50-18.00
13 alloy	18.50-18.75
AXS-679	16.75-17.25

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	17.50-18.00
Grade 2—92-95%	16.50-17.00
Grade 3—90-92%	15.50-16.00
Grade 4—85-90%	15.00-15.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	35⅛
Electrodeposited	29⅜
Rolled, oval, straight, delivered	34.34
Forged ball anodes	34
Brass, 80-20	
Cast, oval, 15 in. or longer	31
Zinc, oval, 99.886, f.o.b. Detroit	17¼
Ball anodes	16¼
Nickel 99 pct plus	
Cast	59.00
Rolled, depolarized	60.00
Cadmium	$2.15
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	79½

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	46½
Copper sulfate, 99.5 crystals, bbl.	12.00
Nickel salts, single or double, 4-100 lb bags, frt allowed	18.00
Nickel chloride, 300 lb bbl	24.50
Silver cyanide, 100 oz lots, per oz.	61¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc sulfate, 89 pct granular	7.15
Zinc cyanide, 100 lb drums	38.00

SCRAP METALS

Brass Mill Scrap

(Cents per pound; add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	16½	15¾
Yellow brass	13⅜	12⅛
Red brass	15	14¼
Commercial bronze	15¼	14½
Manganese bronze	12¾	11⅞
Leaded brass rod ends	13	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	16.00-16.25
No. 2 copper wire	15.00-15.25
Light copper	14.00-14.25
Refinery brass	14.75*
Radiators	10.50

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire	16.00-16.25
No. 2 copper wire	15.00-15.25
Light copper	14.00-14.25
No. 1 composition	13.50-13.75
No. 1 comp turnings	13.00-13.25
Rolled brass	11.50
Brass pipe	12.50
Radiators	10.50-10.75
Heavy yellow brass	10.25-10.50
Aluminum	
Mixed old cast	9.25- 9.50
Mixed old clips	10.25-10.50
Mixed turnings, dry	9.50
Pots and pans	9.75
Low copper	11.00-11.50

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	14½—14¾
No. 2 heavy copper and wire	13½—13¾
Light copper	12½—12¾
Auto radiators (unsweated)	9 — 9¼
No. 1 composition	12 —12¼
No. 1 composition turnings	11½—11¾
Clean red car boxes	9¾—10
Cocks and faucets	9¾—10
Mixed heavy yellow brass	8 — 8¼
Old rolled brass	9 — 9¼
Brass pipe	10¼—10½
New soft brass clippings	11¼—11¾
Brass rod ends	10¼—10½
No. 1 brass rod turnings	10 —10¼

Aluminum

Alum. pistons and struts	5 — 5½
Aluminum crankcases	7½— 8
2S aluminum clippings	10½—11
Old sheet and utensils	7½— 8
Borings and turnings	4½
Misc. cast aluminum	7½— 8
Dural clips (24S)	7½— 8

Zinc

New zinc clippings	7 — 7½
Old zinc	5 — 5½
Zinc routings	3½— 4
Old die cast scrap	4 — 4½

Nickel and Monel

Pure nickel clippings	21 —23
Clean nickel turnings	14 —15
Nickel anodes	20 —22
Nickel rod ends	20 —22
New Monel clippings	12 —14
Clean Monel turnings	8 — 9
Old sheet Monel	10 —12
Old Monel castings	9 —10
Inconel clippings	11 —13
Nickel silver clippings, mixed	8 —10
Nickel silver turnings, mixed	6 — 7

Lead

Soft scrap, lead	8¾— 9
Battery plates (dry)	4½— 4¾

Magnesium

Segregated solids	9 —10
Castings	5½— 6½

Miscellaneous

Block tin	60 —62
No. 1 pewter	38 —40
No. 1 auto babbitt	35 —37
Mixed common babbitt	8¾— 9
Solder joints	11 —11⅛
Siphon tops	40 —42
Small foundry type	11½—12
Monotype	10½—11
Lino. and stereotype	9¾—10¼
Electrotype	8¾— 9
New type shell cuttings	12½—12¾
Hand picked type shells	5 — 5½
Lino. and stereo. dross	4¼— 4¾
Electro. dross	2¾— 3

MARKETS—PRICES—TRENDS

SCRAP
Iron & Steel

Steel Grades Score Year's Biggest Advance

Prices were generally higher in a rugged market during the past week. No. 1 heavy melting steel was quotable $1.50 a ton higher in Pittsburgh this week. In Philadelphia the advance was $1.00. Chicago was $2.00 higher.

Almost every other major market shared the advance in steelmaking grades in a trend that was enough to give steel buyers the jitters. The effect of high steel operating rates and an increase in conversion steel purchases is making itself felt.

Cast grades shared in the gains in only a few areas though the general tone of the cast iron scrap market remains firm. One of the sharpest steelmaking advances came in Detroit where No. 1 bundles were $2.50 a ton above last week's figures. Boston brokers raised their No. 1 steel buying prices by as much as $3.00 a ton on local conditions; in New York they were up $1.00 on this grade.

Major question in the trade this week was whether prices would get out of hand. Admittedly, this week's advances were much bigger than steel buyers expected.

PITTSBURGH—Competitive bidding for available scrap pushed the price of No. 1 heavy melting grade to a top of $35.50 this week, an advance of $1.50. Brokers were paying $35 to fill old orders, less than a week after a large consumer had bought a representative tonnage at $34. A reported sale at $36, while not confirmed, would be in line with the current price in the East. Broker buying prices reflected the belief that further advances were in the offing. No. 1 bundles from Detroit were being delivered here at more than $40. With the exception of cast and railroad specialties, other grades advanced from 50¢ to $1.

PHILADELPHIA—New buying of steel grades was done last week at prices $1 above the former levels. Turnings grades were up by 1 to $1.50. Mixed turnings were not being bought by any local mill. Low phos grades were up 50¢ to $1. Railroad specialties were up $2. Malleable cast was up $1. Other cast grades were unchanged. A virtual ceiling over cast prices in this market is resulting from the availability of foreign pig iron at delivered prices of about $38 for basic and $40 for foundry. One buyer won't pay more than $35 for breakable cast. Scrap shipments are handicapped by a car shortage.

NEW YORK—Prices of steelmaking grades moved up again this week in a strong and active market. There is no sign this week of a downturn, fear is that prices may go higher though all hope to avoid a repetition of 1948 behavior. No. 1 steel was up $1 a ton and No. 2 bundles and turnings were 50¢ a ton higher. Cast grades did not share the steel upswing but they held firm at current levels.

DETROIT — The Detroit market is strong in all departments, but electric furnace grades have again caught fire. With the strongest indication yet that the Chrysler strike may be settled in a matter of hours, conversion grades have taken the spotlight in a big way. The price of No. 1 bundles is up $2.50 this week with every indication that it may go higher. Industrial lists this month have brought the highest prices in months according to the trade. The market is orderly and dealer scrap is still being discounted. Dealers continue to report difficulty in making sales although the strong tempo of the market is universally recognized.

CLEVELAND—Prices were unchanged at press time in a rugged scrap market here and in the valley. The pressure is terrific. Some brokers owe a considerable tonnage at $34 while railroads have already been offered $36 for the heavy melting and a tonnage of automotive bundles brought more than $36, according to reports. Tonnage moving to converters is keeping the market upset, while mills are trying to stave off buying until the furor quiets down. It's a waiting game.

ST. LOUIS—Both steel and foundry grades showed strength this week in the St. Louis industrial district as a result of renewed buying in the first group and revival in the second. Business has improved and the consumption is said to be ahead of receipts.

CINCINNATI — Prices of nearly all grades advanced in a strong market here, based on sales of representative tonnages to district consumers. Foundry grades, particularly rail, are moving. Also, some mills are now taking limited tonnages of No. 2 grades. Speculation and confusion are evident in the market here and both are contributing to the upward price spiral.

CHICAGO—The price of No. 1 heavy melting steel this week is quotable on appraisal at $31 to $32 a gross ton, an advance of $2 a gross ton. This is based on adjacent area buying prices and on the fact that brokers are paying from $31 to $32 to cover old orders. Rejection of No. 2 bundles continues and one buyer reportedly rejected some No. 2 heavy melting steel last week. No. 1 R. R. heavy melting was up $1 a ton to a top of $33.

BOSTON—Broker buying prices for No. 1 heavy melting steel soared by as much as $3 a ton in what was reported to be a purely local situation, since other steelmaking grades did not share this whopping advance here. All grades did advance, however, in the most active market in many months. No. 1 cast moved up $4 a ton, a jump which even left many brokers amazed. Except for No. 1 heavy melting, steel and blast furnace material was $1 a ton higher.

BIRMINGHAM—Increased interest is being shown here for railroad specialties with a resultant advance in prices. Demand is light for openhearth grades of steel. No railroad heavy melting steel is coming into this district and the quoted price is on a last sale basis.

BUFFALO—Pronounced strength rules the scrap market here. Prices on cast scrap pushed ahead $2 to $3 a ton on substantial sales to one of the leading consumers in the area. Cupola moved up to a range of $36-$36.50 while No. 1 machinery was quoted at $38-$38.50.

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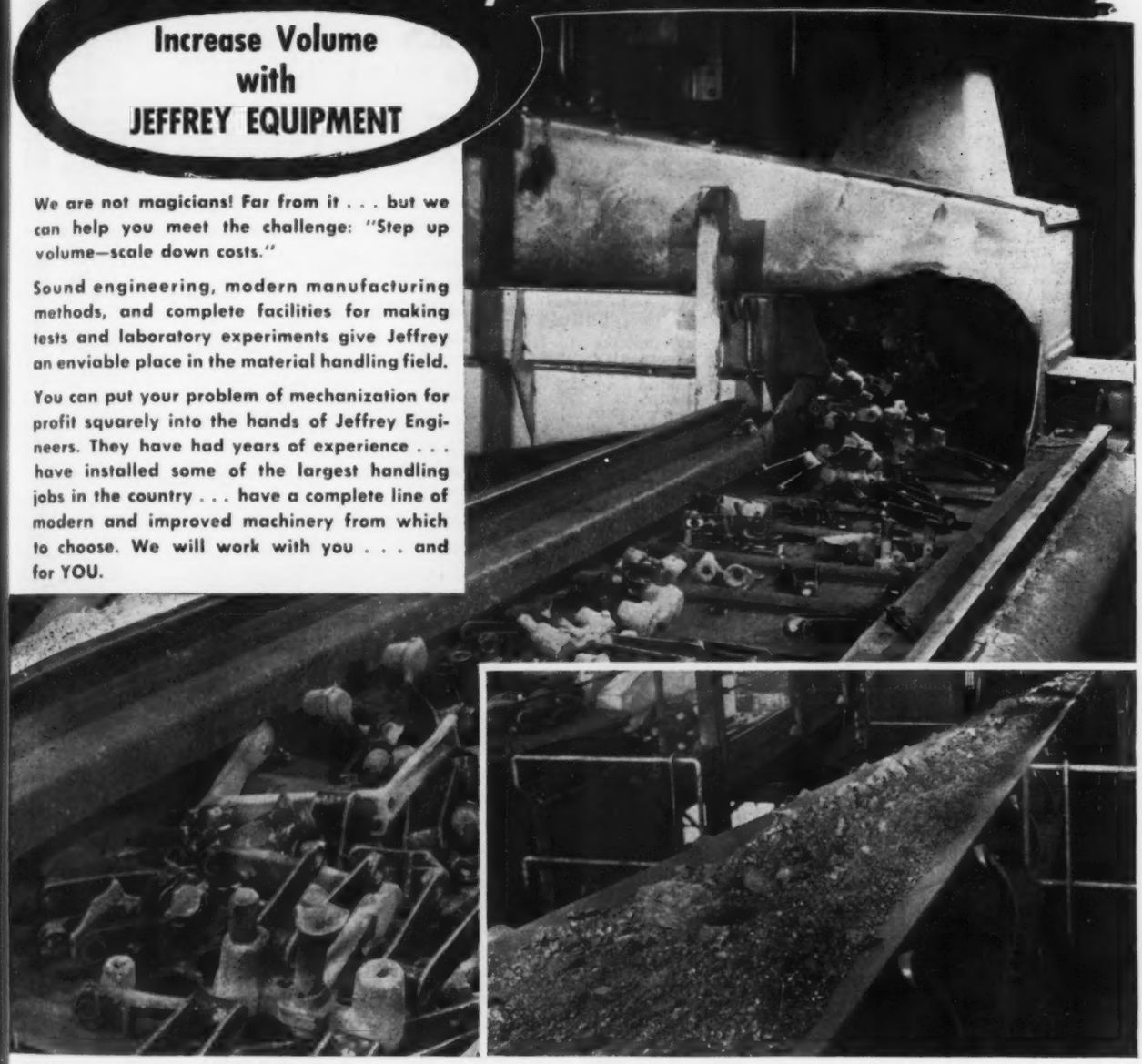

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Buffalo 2	Denver 2	Huntington 19	Philadelphia 3	Scranton 3

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Iron and Steel

SCRAP PRICES

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$35.00 to $35.50
No. 2 hvy. melting	31.00 to 31.50
No. 1 bundles	35.00 to 35.50
No. 2 bundles	27.50 to 28.00
Machine shop turn.	25.00 to 25.50
Mixed bor. and ms. turns.	25.00 to 25.50
Shoveling turnings	27.50 to 28.00
Cast iron borings	26.50 to 27.00
Low phos. plate	36.50 to 37.00
Heavy turnings	32.50 to 33.50
No. 1 RR. hvy. melting	35.50 to 36.00
Scrap rails, random lgth.	39.50 to 40.00
Rails 2 ft and under	41.00 to 42.00
RR. steel wheels	36.50 to 37.00
RR. spring steel	36.50 to 37.00
RR. couplers and knuckles	36.50 to 37.00
No. 1 machinery cast	40.00 to 41.00
Mixed yard cast.	35.50 to 36.00
Heavy breakable cast.	33.00 to 34.00
Malleable	35.00 to 36.00

Chicago

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 factory bundles	31.00 to 32.00
No. 1 dealers' bundles	28.00 to 29.00
No. 2 dealers' bundles	24.00 to 25.00
Machine shop turn.	19.50 to 20.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	21.50 to 22.00
Cast iron borings	20.00 to 21.00
Low phos. forge crops	32.00 to 33.00
Low phos. plate	31.50 to 32.50
No. 1 RR. hvy. melting	35.00 to 36.00
Scrap rails, random lgth.	36.00 to 37.00
Rerolling rails	46.00 to 47.00
Rails 2 ft and under	41.00 to 42.00
Locomotive tires, cut	34.00 to 35.00
Cut bolsters & side frames	31.00 to 32.00
Angles and splice bars	37.00 to 38.00
RR. steel car axles	45.00 to 46.00
RR. couples and knuckles	32.00 to 33.00
No. 1 machinery cast.	42.00 to 43.00
No. 1 agricul. cast.	38.00 to 39.00
Heavy breakable cast.	30.00 to 31.00
RR. grate bars	30.00 to 31.00
Cast iron brake shoes	31.00 to 32.00
Cast iron car wheels	36.00 to 37.00
Malleable	40.00 to 41.00

Philadelphia

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 bundles	26.00 to 27.00
No. 2 bundles	20.50 to 21.50
Machine shop turn.	18.50 to 19.50
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	20.00 to 21.00
Low phos. punchings, plate	30.00 to 31.00
Low phos. 5 ft and under	29.00 to 30.00
Low phos. bundles	27.00 to 27.50
Hvy. axle forge turn.	26.00 to 27.00
Clean cast chem. borings	29.00 to 30.00
RR. steel wheels	33.00 to 34.00
RR. spring steel	33.00 to 34.00
Rails 18 in. and under	38.50 to 39.50
No. 1 machinery cast	37.00 to 38.00
Mixed yard cast	33.00 to 34.00
Heavy breakable cast	35.00 to 36.00
Cast iron carwheels	39.00 to 40.00
Malleable	40.00 to 41.00

Cleveland

No. 1 hvy. melting	$31.00 to $31.50
No. 2 hvy. melting	28.00 to 28.50
No. 1 busheling	31.00 to 31.50
No. 1 bundles	31.00 to 31.50
No. 2 bundles	24.50 to 25.00
Machine shop turn.	21.50 to 22.00
Mixed bor. and turn.	24.50 to 25.00
Shoveling turnings	24.50 to 25.00
Cast iron borings	24.50 to 25.00
Low phos. 2 ft and under	31.00 to 31.50
Steel axle turn.	29.00 to 29.50
Drop forge flashings	31.00 to 31.50
No. 1 RR. hvy. melting	34.00 to 34.50
Rails 3 ft and under	43.00 to 43.50
Rails 18 in. and under	44.00 to 45.00
No. 1 machinery cast.	44.00 to 44.50
RR. cast	44.00 to 44.50
RR. grate bars	32.00 to 33.00
Stove plate	36.00 to 37.00
Malleable	40.00 to 41.00

Youngstown

No. 1 hvy. melting	$34.50 to $35.00
No. 2 hvy. melting	31.50 to 32.00
No. 1 bundles	34.50 to 35.00
No. 2 bundles	28.50 to 29.00
Machine shop turn.	24.00 to 24.50
Shoveling turnings	26.00 to 26.50
Cast iron borings	26.00 to 26.50
Low phos. plate	35.50 to 36.00

Buffalo

No. 1 hvy. melting	$29.50 to $30.00
No. 2 hvy. melting	27.50 to 28.00
No. 1 busheling	27.50 to 28.00
No. 1 bundles	28.50 to 29.00
No. 2 bundles	26.00 to 26.50
Machine shop turn.	18.00 to 18.50
Mixed bor. and turn.	19.00 to 19.50
Shoveling turnings	20.50 to 21.00
Cast iron borings	19.50 to 20.00
Low phos. plate	31.00 to 31.50
Scrap rails, random lgth.	33.50 to 34.00
Rails 2 ft and under	38.50 to 39.00
RR. steel wheels	33.50 to 36.00
RR. spring steel	33.50 to 36.00
RR. couplers and knuckles	33.50 to 36.00
No. 1 machinery cast.	38.00 to 38.50
No. 1 cupola cast.	36.00 to 36.50
Stove plate	34.00 to 34.50
Small indus. malleable	30.00 to 30.50

Birmingham

No. 1 hvy. melting	$26.00
No. 2 hvy. melting	24.00
No. 2 bundles	22.00
No. 1 busheling	26.00
Machine shop turn.	$20.00 to $20.50
Shoveling turnings	20.00 to 21.00
Cast iron borings	19.00
Bar crops and plate	30.50
Structural and plate	30.00
No. 1 RR. hvy. melt.	28.00 to 28.50
Scrap rails, random lgth.	33.00 to 34.00
Rerolling rails	39.00
Rails 2 ft and under	36.00
Angles & splice bars	35.00 to 36.00
Std. steel axles	30.00 to 31.00
No. 1 cupola cast.	35.00 to 36.00
Stove plate	30.50 to 31.50
Cast iron carwheels	30.00 to 31.00

St. Louis

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	27.00 to 28.00
No. 2 bundled sheets	26.50 to 27.50
Machine shop turn.	18.00 to 19.00
Shoveling turnings	20.00 to 21.00
Rails, random lengths	34.00 to 36.00
Rails 3 ft and under	39.00 to 41.00
Locomotive tires, uncut	31.00 to 32.00
Angles and splice bars	37.00 to 38.00
Std. steel car axles	45.00 to 46.00
RR. spring steel	33.00 to 34.00
No. 1 machinery cast.	38.00 to 39.00
Hvy. breakable cast.	31.00 to 32.00
Cast iron brake shoes	30.00 to 31.00
Stove plate	29.00 to 30.00
Cast iron car wheels	37.00 to 38.00
Malleable	34.00 to 35.00

New York

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$24.50 to $25.00
No. 2 hvy. melting	20.50 to 21.00
No. 2 bundles	19.50 to 20.00
Machine shop turn.	14.50 to 15.00
Mixed bor. and turn.	14.50 to 15.00
Shoveling turnings	16.00 to 16.50
Clean cast chem. bor.	23.00 to 24.00
No. 1 machinery cast.	30.00 to 30.50
Mixed yard cast.	28.00 to 28.50
Charging box cast.	29.00 to 30.00
Heavy breakable cast.	29.00 to 30.00
Unstrp. motor blocks	21.00 to 21.50

Boston

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$24.00 to $25.50
No. 2 hvy. melting	20.00 to 20.50
No. 1 bundles	24.00 to 25.50
No. 2 bundles	$18.50 to $19.50
Machine shop turn.	15.00 to 15.50
Mixed bor. and turn.	14.00 to 14.50
Shoveling turnings	16.50 to 17.50
No. 1 busheling	22.00 to 22.50
Clean cast chem. borings	19.50 to 20.00
No. 1 machinery cast.	34.00 to 35.00
No. 2 machinery cast.	30.00 to 32.00
Heavy breakable cast.	30.00 to 32.00
Stove plate	27.00 to 28.00

Detroit

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$26.50 to $27.00
No. 2 hvy. melting	24.00 to 24.50
No. 1 bundles	32.50 to 33.00
New busheling	31.50 to 32.00
Flashings	26.50 to 27.00
Machine shop turn.	17.50 to 18.00
Mixed bor. and turn.	17.50 to 18.00
Shoveling turnings	21.00 to 21.50
Cast iron borings	21.00 to 21.50
Low phos. plate	31.50 to 32.00
No. 1 cupola cast.	37.00 to 38.00
Heavy breakable cast.	30.00 to 31.00
Stove plate	32.00 to 33.00
Automotive cast.	41.00 to 42.00

Cincinnati

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	$31.50 to $32.00
No. 2 hvy. melting	26.50 to 27.00
No. 1 bundles	31.50 to 32.00
No. 2 bundles, black	25.50 to 26.00
No. 2 bundles, mixed	20.00 to 20.50
Machine shop turn.	17.50 to 18.00
Mixed bor. and turn.	19.50 to 20.00
Shoveling turnings	20.50 to 21.00
Cast iron borings	20.50 to 21.00
Low phos. 18 in. under	37.50 to 38.00
Rails, random lengths	37.50 to 38.50
Rails, 18 in. and under	46.50 to 47.50
No. 1 cupola cast.	44.00 to 45.00
Hvy. breakable cast.	35.50 to 36.50
Drop broken cast.	45.50 to 46.50

San Francisco

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bundles	16.00
No. 2 bundles	16.00
No. 3 bundles	13.00
Machine shop turn.	9.00
Elec. fur. 1 ft and under	23.00
No. 1 RR. hvy. melting	20.00
Scrap rails, random lgth.	20.00
No. 1 cupola cast.	$30.00 to 33.50

Los Angeles

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bundles	16.00
No. 2 bundles	16.00
No. 3 bundles	13.00
Mach. shop turn.	5.00
Elec. fur. 1 ft and under	20.00
No. 1 RR. hvy. melting	20.00
No. 1 cupola cast.	$32.50 to 35.00

Seattle

No. 1 hvy. melting	$18.00
No. 2 hvy. melting	18.00
No. 1 bundles	16.00
No. 2 bundles	16.00
No. 3 bundles	12.00
Elec. fur. 1 ft and under	$29.00 to 30.00
RR. hvy. melting	19.00
No. 1 cupola cast.	30.00 to 35.00
Heavy breakable cast.	20.00

Hamilton, Ont.

No. 1 hvy. melting	$27.00
No. 1 bundles	19.00
No. 2 bundles	19.00
Mechanical bundles	25.00
Mixed steel scrap	23.00
Mixed bor. and turn.	20.00
Rails, remelting	27.00
Rails, rerolling	30.00
Bushelings	21.50
Bush., new fact, prep'd.	25.00
Bush., new fact, unprep'd.	20.00
Short steel turnings	20.00
Cast scrap	40.00

For the Purchase or Sale of

Iron and Steel Scrap . . .

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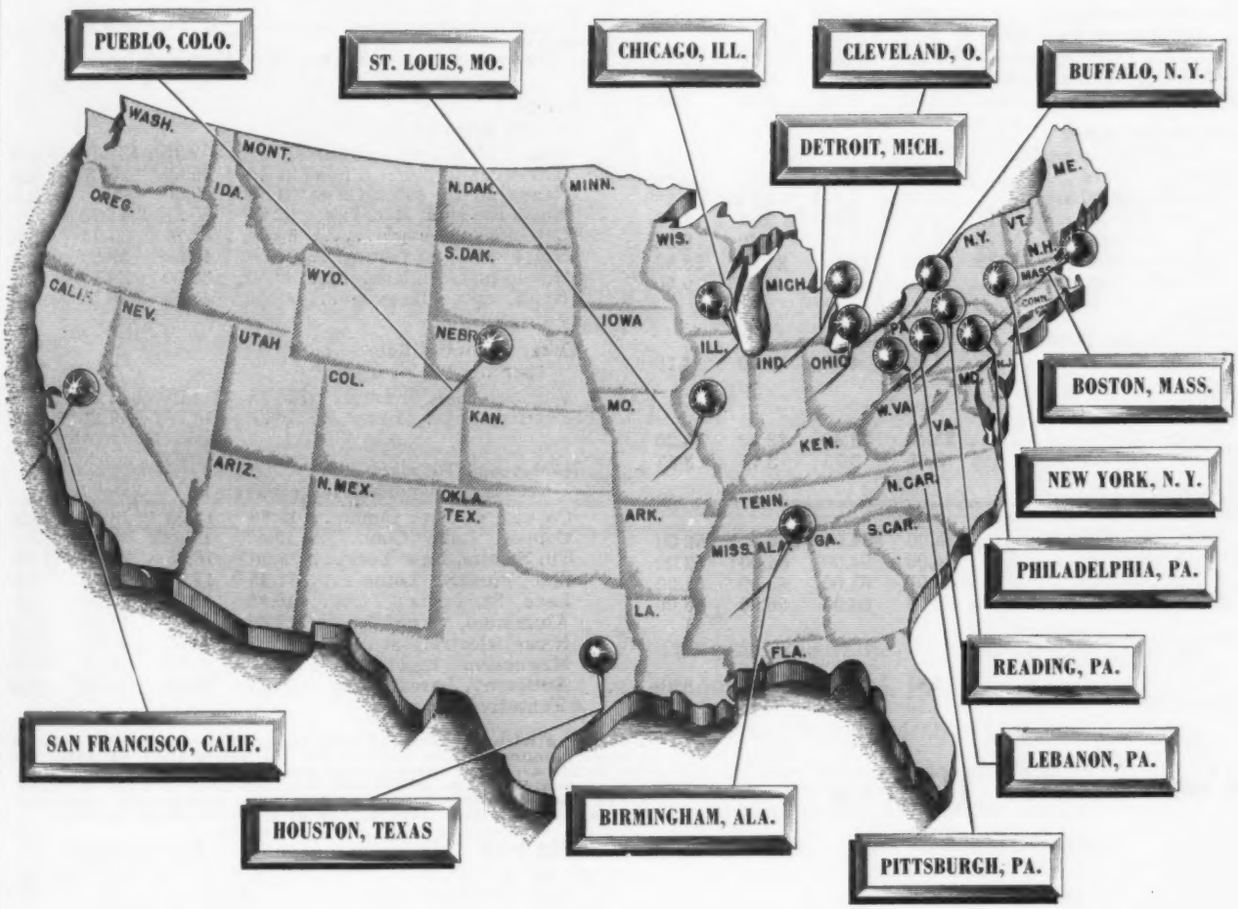

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	May 2, 1950	Apr. 25, 1950	Apr. 4, 1950	May 3 1949
Hot-rolled sheets	3.35	3.35	3.35	3.25
Cold-rolled sheets	4.10	4.10	4.10	4.00
Galvanized sheets (10 ga)	4.40	4.40	4.40	4.40
Hot-rolled strip	3.25	3.25	3.25	3.25
Cold-rolled strip	4.21	4.21	4.21	4.038
Plates	3.50	3.50	3.50	3.40
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R strip (No. 302)	33.00	33.00	33.00	33.00
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes	$7.50	$7.50	$7.50	$7.75
Tinplate, electro (0.50 lb)	6.60	6.60	6.60	6.70
Special coated mfg. ternes	6.50	6.50	6.50	6.65
Bars and Shapes: (cents per pound)				
Merchant bars	3.45	3.45	3.45	3.35
Cold-finished bars	4.145	4.145	4.145	3.995
Alloy bars	3.95	3.95	3.95	3.75
Structural shapes	3.40	3.40	3.40	3.25
Stainless bars (No. 302)	28.50	28.50	28.50	28.50
Wrought iron bars	9.50	9.50	9.50	9.50
Wire: (cents per pound)				
Bright wire	4.50	4.50	4.50	4.15
Rails: dollars per 100 lb)				
Heavy rails	$3.40	$3.40	$3.40	$3.20
Light rails	3.75	3.75	3.75	3.55
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$54.00	$54.00	$54.00	$52.00
Slabs, rerolling	54.00	54.00	54.00	52.00
Forging billets	63.00	63.00	63.00	61.00
Alloy blooms, billets, slabs	66.00	66.00	66.00	63.00
Wire Rod and Skelp: (cents per pound)				
Wire rods	3.85	3.85	3.85	3.40
Skelp	3.15	3.15	3.15	3.25

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Pig Iron: (per gross ton)	May 2, 1950	Apr. 25, 1950	Apr. 4, 1950	May 3 1949
No. 2, foundry, Phila.	$50.42	$50.42	$50.42	$50.56
No. 2, Valley furnace	46.50	46.50	46.50	46.50
No. 2, Southern Cin'ti	49.08	49.08	49.08	46.80
No. 2, Birmingham	42.38	42.38	42.38	40.71
No. 2, foundry, Chicago†	46.50	46.50	46.50	46.50
Basic del'd Philadelphia	49.92	49.92	49.92	49.74
Basic, Valley furnace	46.00	46.00	46.00	46.00
Malleable, Chicago†	46.50	46.50	46.50	46.50
Malleable, Valley	46.50	46.50	46.50	46.50
Charcoal, Chicago	68.56	68.56	68.56	73.78
Ferromanganese‡	173.40	173.40	173.40	173.40

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$35.25	$33.75	$32.75	$23.75
Heavy melt'g steel, Phila.	26.50	25.50	25.25	22.00
Heavy melt'g steel, Ch'go	31.50	29.50	28.50	23.50
No. 1 hy. com. sh't, Det.	32.75	30.25	26.75	16.75
Low phos. Young'n	35.75	35.75	33.75	24.75
No. 1, cast, Pittsburgh	40.50	40.50	39.50	28.50
No. 1, cast, Philadelphia	37.50	37.50	36.50	28.00
No. 1, cast, Chicago	42.50	42.50	40.50	29.00
Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.25	$14.25	$14.25	$14.50
Foundry coke, prompt	16.25	16.25	16.25	16.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	19.50	19.50	18.50	18.50
Copper, Lake Conn.	19.625	19.625	18.625	23.625
Tin Straits, New York	*76.50*†	76.75	76.50	$1.03
Zinc, East St. Louis	11.25	11.00	10.50	12.50
Lead, St. Louis	10.80	10.55	10.30	14.80
Aluminum, virgin	17.00	17.00	17.00	17.00
Nickel electrolytic	42.97	42.97	42.97	42.93
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	24.50	24.50	24.50	38.50

† Tentative.

Composite Prices

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)

	Finished Steel Base Price	Pig Iron	Scrap Steel
May 2, 1950	3.837¢ per lb.	$46.38 per gross ton	$31.08 per gross ton
One week ago	3.837¢ per lb.	46.38 per gross ton	29.58 per gross ton
One month ago	3.837¢ per lb.	46.38 per gross ton	28.83 per gross ton
One year ago	3.746¢ per lb.	46.13 per gross ton	23.08 per gross ton

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Scrap Steel High	Scrap Steel Low
1950	3.837¢ Jan. 3	3.837¢ Jan. 3	$46.38 Feb. 7	$45.88 Jan. 3	$31.08 May 2	$26.25 Jan. 3
1949	3.837¢ Dec. 27	3.3705¢ May 3	46.87 Jan. 18	45.88 Sept. 6	43.00 Jan. 4	19.33 June 28
1948	3.721¢ July 27	3.193¢ Jan. 1	46.91 Oct. 12	39.58 Jan. 6	43.16 July 27	39.75 Mar. 9
1947	3.193¢ July 29	2.848¢ Jan. 1	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
1946	2.848¢ Dec. 31	2.464¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.464¢ May 29	2.396c Jan. 1	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.396¢	2.396¢	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.396¢	2.396¢	23.61	23.61	$19.17	$19.17
1942	2.396¢	2.396¢	23.61	23.61	19.17	19.17
1941	2.396¢	2.396¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1932	1.89196¢ July 5	1.83910¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron as Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

The Bettmann Archive

Proper Balance*

Ferro-Silicon 25, 50, 65, 75, 85, 90%
Special Blocking 50% Ferro-Silicon
Low Carbon Ferro-Chrome Silicon
High Carbon Ferro-Chrome
Ferro-Manganese
Borosil • Simanal

*The principle is no different today than it was a hundred years ago. In ferro-alloys you must have the right amount of the right thing at the right time. The purity and uniformity of our products enable you to get the best possible results.

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Ohio Ferro-Alloys Corporation
Canton, Ohio

Chicago Detroit Pittsburgh San Francisco Tacoma

BRIQUETS
SILICON • MANGANESE • CHROME
SILICO-MANGANESE

STEEL PRICES

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page.
Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

	Pittsburgh	Chicago	Gary	Cleveland	Canton Massillon	Middletown	Youngstown	Bethlehem	Buffalo	Conshohocken	Johnstown	Sparrows Point	Granite City	Detroit
INGOTS Carbon forging, net ton	$50.00 1													$50.00 31
Alloy, net ton	$51.00 1.17													$51.00 31
BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton	$53.00 1	$53.00 1	$53.00 1				$57.00 13		$53.00 3	$58.00 26	$53.00 3			
Carbon forging billets, net ton	$63.00 1	$63.00 1.4	$63.00 1.8	$63.00 4			$63.00 25		$63.00 3.4	$65.00 26	$63.00 3			$63.00 31
Alloy, net ton	$66.00 1.17	$66.00 1.4	$66.00 1		$66.00 4.42		$66.00 13	$66.00 3	$66.00 3.4	$68.00 26	$66.00 3			$66.00 31
SHEET BARS							$57.00 13							
PIPE SKELP	3.15 1						3.15 1.4							
WIRE RODS	3.85 2.18	3.85 2.4.33	3.85 6	3.85 2			3.85 6				3.85 3	3.95 3		
SHEETS Hot-rolled (18 ga. & hvr.)	3.35 1.5.9.15	3.35 23	3.35 1.6.8	3.35 4.5			3.35 1.4.6.13		3.35 3	3.45 26		3.35 3		3.55 12
Cold-rolled	4.10[1.5] 7.9.15.63		4.10 1.6.8	4.10 4.15		4.10 7	4.10 4.6		4.10 3			4.10 3	4.30 22	4.30 12
Galvanized (10 gage)	4.40 1.9.15		4.40 1.8		4.40 4		4.65[64] 4.75[44]					4.40 3		
Enameling (12 gage)	4.40 1		4.40 1.8	4.40 4		4.40 7	4.40[6] 4.90[76]						4.60 22	4.70 12
Long ternes (10 gage)	4.80 9.15		4.80 1			4.80 7	4.80 64							
Hi Str. low alloy, h.r.	5.05 1.5.9	5.05 1	5.05 1.6.8	5.05 4.5			5.05 1.4.6.13		5.05 3	5.05 26		5.05 3		5.25 12
Hi str. low alloy, c.r.	6.20 1.5.9		6.20 1.6.8	6.20 4.5			6.20 4.6.13		6.20 3			6.20 3		6.40 12
Hi str. low alloy, galv.	6.75 1											6.75 3		
STRIP Hot-rolled	3.25 5.7.9.28	3.25 3.66	3.25 1.6.8	3.25 5			3.25 1.4.6.13		3.25 3	3.35 26		3.25 3		3.45 12.47
Cold-rolled	4.15 5.7.9.62	4.30 3.66	4.30 8	4.15 2.5		4.15 7	4.15 4.6.13.40.45.49		4.15 3			4.15 3		4.40[68.81] 4.35[12.47]
Hi str. low alloy, h.r.	4.95 9		4.95 1.6.8	4.95 5			4.95 1.4.6.13		4.95 3	4.95 26		4.95 3		5.15 12
Hi Str. low alloy, c.r.	6.20 9			6.20 2.5			6.20 4.6.13		6.20 3			6.20 3		6.40 12
TINPLATE† Cokes, 1.50-lb base box 1.25 lb, deduct 20¢	$7.50 1.5.9.15		$7.50 1.6.8				$7.50 4					$7.60 3	$7.70 22	
Electrolytic 0.25, 0.50, 0.75 lb box	Deduct $1.15, 90¢ and 65¢ respectively from 1.50-lb coke base box price													
BLACKPLATE, 29 gage Hollowware enameling	5.30 1.5.15		5.30 1.6				5.30 6					5.40 3	5.50 22	
BARS Carbon steel	3.45 1.5.9.17	3.45 1.4.23	3.45 1.6.8	3.45 4	3.45 4		3.45 1.4.6		3.45 3.4		3.45 3			3.65 12
Reinforcing‡	3.45 1.5	3.45 4	3.45 1.6.8	3.45 4			3.45 1.4.6		3.45 3.4		3.45 3	3.45 3		
Cold-finished	4.10[5] 4.15[3.4] 17.52.69.71	4.15[3] 23.69.70	4.15 4.78.74	4.15 2.61	4.15 4.32.52		4.15 6.40.57		4.15 70					4.35[12] 4.30[64]
Alloy, hot-rolled	3.95 1.17	3.95 1.4.28	3.95 1.6.8		3.95 4		3.95 1.6.25	3.95 3	3.95 3.4		3.95 3			4.25 12
Alloy, cold-drawn	4.90 2.17.52.69.71	4.90 2.28.69.70	4.90 4.78.74	4.90 2.61	4.90 4.43.52		4.90 6.25.57	4.90 3	4.90 3.70					5.05[64]
Hi str. low alloy, h.r.	5.20 1.5		5.20 1.6.8	5.20 4			5.20 1.6	5.20 3	5.20 3		5.20 3			5.40 12
PLATE Carbon steel	3.50 1.5	3.50 1	3.50 1.6.8	3.50 4			3.50 1.13		3.50 3	3.60 26	3.50 3	3.50 3		3.75 12
Floor Plates	4.55 1	4.55 1	4.55 3	4.55 5						4.55 26				
Alloy	4.40 1	4.40 1	4.40 1				4.40 13			4.40 26	4.40 3	4.40 3		
Hi Str. low alloy	5.35 1.5	5.35 1	5.35 1.8	5.35 4.5			5.35 6			5.35 26	5.35 3	5.35 3		5.60 12
SHAPES, Structural	3.40 1.5.9	3.40 1.23	3.40 1.6.8					3.45 3	3.45 3		3.45 3			
Hi Str. low alloy	5.15 1.5	5.15 1	5.15 1.6.8				5.15 6	5.15 3	5.15 3		5.15 3			
MANUFACTURER'S WIRE Bright	4.50 2.5.18	4.50[3] 4.12.33.34		4.50 2.77			4.50 6	Kokomo=4.60[30]			4.50 3	4.60 3	Duluth=4.50[2] Pueblo=4.75[14]	
PILING, Steel Sheet	4.20[1.9]	4.20 1							4.20 3					

STEEL PRICES

Smaller numbers indicate producing companies. See key at right. Prices are in cents per lb unless otherwise noted. Extras apply.

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana		
					INGOTS Carbon forging net ton
	$59.00 83				Alloy, net ton
		$53.00 11	F=$72.00[19]		BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton
	$71.00 83	$63.00 11	F=$82.00[19]	Geneva=$61.00[16]	Carbon forging billets, net ton
	$74.00 83		F=$85.00[19]		Alloy net ton
				Portsmouth=$55.00[20]	SHEET BARS
					PIPE SKELP
	4.25 83	3.85 11	SF=4.50[24] LA=4.65[24,62]	Portsmouth=3.85[20] Worcester=4.15[3]	WIRE RODS
		3.35 4,11	SF, LA=4.05[24] F=4.25[19]	Ashland[7]=3.35 Niles=3.50[64]	SHEETS Hot-rolled (18 ga. & hvr.)
		4.10 11	SF=5.05[24] F=5.00[19]		Cold-rolled
		4.40 4,11	SF, LA=5.15[24]	Ashland=4.40[7] Kokomo=4.50[30]	Galvanized (10 gage)
					Enameling (12 gage)
					Long ternes (10 gage)
		5.05 11	F=6.74[19]		Hi Str. low alloy, h.r.
			F=7.05[19]		Hi Str. low alloy, c.r.
					Hi Str. low alloy, galv.
3.65 83	3.65 83	3.25 11	SF, LA=4.00[24,62] F=4.40[19], S=4.25[62]	Ashland=3.25[7] Atlanta=3.40[65]	STRIP Hot-rolled
			F=5.40[19] LA=5.50[27]	New Haven=4.65[3,68]	Cold-rolled
		4.95 11	F=6.64[19]		Hi Str. low alloy, h.r.
			F=6.95[19]		Hi Str. low alloy, c.r.
		7.60 11	SF=8.25[24]		TINPLATE Cokes, 1.50-lb base box 1.25 lb, deduct 20¢
Deduct $1.15, 90¢ and 65¢ respectively from 1.50-lb coke base box price					Electrolytic 0.25, 0.50, 0.75 lb box
					BLACKPLATE, 29 gage Hollowware enameling
4.05 83	3.85 83	3.45 4,11	SF, LA=4.15[24] LA=4.15[62]	Atlanta=3.60[65]	BARS Carbon steel
4.05 83	3.85 83	3.45 4,11	SF, S=4.20[62] F=4.10[19]	Atlanta=3.60[65]	Reinforcing‡
				Putnam, Newark=4.55[69]	Cold-finished
4.55 83	4.35 83		LA=5.00[62] F=4.95[19]		Alloy, hot-rolled
				Newark,[69] Worcester[3]=5.20 Hartford=5.20[4]	Alloy, cold-drawn
		5.20	F=6.25[19]		Hi Str. low alloy, h.r.
	3.90 83	3.50 4,11	F=4.10[19] S=4.40[62] Geneva=3.50[16]	Claymont=3.60[29] Coatesville=3.60[21] Harrisburg=3.50[32]	PLATE Carbon steel
				Harrisburg=4.55[32]	Floor plates,
			F=5.40[19]	Coatesville=4.50[21]	Alloy
		5.35 11	F=5.95[19]	Geneva=5.35[16]	Hi Str. low alloy
4.00 83	3.80 83	3.40 11	SF=3.95[62] LA=4.00[24,62]	Phoenixville=3.30[56] Geneva=3.40[16]	SHAPES, Structural
		5.15 11	F=4.00[19] S=4.05[62]	Fontana=5.75[19] Geneva=5.15[16]	Hi Str. low alloy
§ 5.10 83	4.90 83	4.50 4,11	SF, LA=5.45[24,62]	Portsmouth=4.50[29] Worcester=4.80[3]	MANUFACTURER'S WIRE Bright

Notes: †Special coated mfg ternes deduct $1.00 from 1.50-lb coke base box price. Can-making quality blackplate, 55 to 128-lb, deduct $1.90 from 1.50-lb coke base box. ‡Straight lengths only from producer to fabricator.

KEY TO STEEL PRODUCERS

With Principal Offices

1 Carnegie-Illinois Steel Corp., Pittsburgh
2 American Steel & Wire Co., Cleveland
3 Bethlehem Steel Co., Bethlehem
4 Republic Steel Corp., Cleveland
5 Jones & Laughlin Steel Corp., Pittsburgh
6 Youngstown Sheet & Tube Co., Youngstown
7 Armco Steel Corp., Middletown, Ohio
8 Inland Steel Co., Chicago
9 Weirton Steel Co., Weirton, W. Va.
10 National Tube Co., Pittsburgh
11 Tennessee Coal, Iron & R. R. Co., Birmingham
12 Great Lakes Steel Corp., Detroit
13 Sharon Steel Corp., Sharon, Pa.
14 Colorado Fuel & Iron Corp., Denver
15 Wheeling Steel Corp., Wheeling, W. Va.
16 Geneva Steel Co., Salt Lake City
17 Crucible Steel Co. of America, New York
18 Pittsburgh Steel Co., Pittsburgh
19 Kaiser Co., Inc., Oakland, Calif.
20 Portsmouth Steel Corp., Portsmouth, Ohio
21 Lukens Steel Co., Coatesville, Pa.
22 Granite City Steel Co., Granite City, Ill.
23 Wisconsin Steel Co., South Chicago, Ill.
24 Columbia Steel Co., San Francisco
25 Copperweld Steel Co., Glassport, Pa.
26 Alan Wood Steel Co., Conshohocken, Pa.
27 Calif. Cold Rolled Steel Corp., Los Angeles
28 Allegheny Ludlum Steel Corp., Pittsburgh
29 Worth Steel Co., Claymont, Del.
30 Continental Steel Corp., Kokomo, Ind.
31 Rotary Electric Steel Co., Detroit
32 Laclede Steel Co., St. Louis
33 Northwestern Steel & Wire Co., Sterling, Ill.
34 Keystone Steel & Wire Co., Peoria, Ill.
35 Central Iron & Steel Co., Harrisburg, Pa.
36 Carpenter Steel Co., Reading, Pa.
37 Eastern Stainless Steel Corp., Baltimore
38 Washington Steel Corp., Washington, Pa.
39 Jessop Steel Co., Washington, Pa.
40 Blair Strip Steel Co., New Castle, Pa.
41 Superior Steel Corp., Carnegie, Pa.
42 Timken Steel & Tube Div., Canton, Ohio
43 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
44 Reeves Steel & Mfg. Co., Dover, Ohio
45 John A. Roebling's Sons Co., Trenton, N. J.
46 Simonds Saw & Steel Co., Fitchburg, Mass.
47 McLouth Steel Corp., Detroit
48 Cold Metal Products Co., Youngstown
49 Thomas Steel Co., Warren, Ohio
50 Wilson Steel & Wire Co., Chicago
51 Sweet's Steel Co., Williamsport, Pa.
52 Superior Drawn Steel Co., Monaca, Pa.
53 Tremont Nail Co., Wareham, Mass.
54 Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
55 Ingersoll Steel Div., Chicago
56 Phoenix Iron & Steel Co., Phoenixville, Pa.
57 Fitzsimmons Steel Co., Youngstown
58 Stanley Works, New Britain, Conn.
59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
60 American Cladmetals Co., Carnegie, Pa.
61 Cuyahoga Steel & Wire Co., Cleveland
62 Bethlehem Pacific Coast Steel Corp., San Francisco
63 Follansbee Steel Corp., Pittsburgh
64 Niles Rolling Mill Co., Niles, Ohio
65 Atlantic Steel Co., Atlanta
66 Acme Steel Co., Chicago
67 Joslyn Mfg. & Supply Co., Chicago
68 Detroit Steel Corp., Detroit
69 Wyckoff Steel Co., Pittsburgh
70 Bliss & Laughlin, Inc., Harvey, Ill.
71 Columbia Steel & Shafting Co., Pittsburgh
72 Cumberland Steel Co., Cumberland, Md.
73 La Salle Steel Co., Chicago
74 Monarch Steel Co., Inc., Hammond, Ind.
75 Empire Steel Co., Mansfield, Ohio
76 Mahoning Valley Steel Co., Niles, Ohio
77 Oliver Iron & Steel Co., Pittsburgh
78 Pittsburgh Screw & Bolt Co., Pittsburgh
79 Standard Forging Corp., Chicago
80 Driver Harris Co., Harrison, N. J.
81 Detroit Tube & Steel Div., Detroit
82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
83 Sheffield Steel Corp., Kansas City
84 Plymouth Steel Co., Detroit

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	12.75	13.50	15.00	14.50	22.75	18.25	20.00	11.25	13.75	11.50
Slabs, billets, rerolling	17.00	18.25	20.25	19.25	30.25	24.50	26.75	15.60	18.50	15.25
Forg. discs, die blocks, rings	30.50	30.50	33.00	32.00	49.00	36.50	41.00	24.50	25.00	25.00
Billets, forging	24.25	24.25	26.25	25.50	39.00	29.00	32.75	19.50	20.00	20.00
Bars, wire, structurals	28.50	28.50	31.00	30.00	46.00	34.00	38.50	23.00	23.50	23.50
Plates	32.00	32.00	34.00	34.00	50.50	39.50	44.00	26.00	26.50-27.00	26.50
Sheets	37.50	37.50	39.50	39.50	53.00	45.50	50.00	33.00	33.50	35.50
Strip, hot-rolled	24.25	25.75	30.00	27.75	46.00	34.50	38.75	21.25	28.00	21.75
Strip, cold-rolled	30.50	33.00	36.50	35.00	55.00	44.50	48.50	27.00	33.50	27.50

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38, 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Ft. Wayne, Ind., 67; Lockport, N. Y., 46.

Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38; W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 80; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, 13; Butler, Pa., 7.

Bars: Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y., 46; Canton, Ohio, 42; Ft. Wayne, Ind., 67.

Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Ft. Wayne, Ind., 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28.

Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44.

Plates: Brackenridge, Pa., 28; Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

Forged discs, die blocks, rings: Pittsburgh, 1, 17; Syracuse, 17; Ferndale, Mich., 28.

Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1.

ELECTRICAL SHEETS

22 gage, HR cut lengths, f.o.b. mill

	Cents per lb.
Armature	6.20
Electrical	6.70
Motor	*7.95
Dynamo	8.75
Transformer 72	9.30
Transformer 65	9.85
Transformer 58	10.55
Transformer 52	11.35

PRODUCING POINTS—Beech Bottom, W. Va., 18; Brackenridge, Pa., 28; Follansbee, W. Va., 63; Granite City, Ill., 22*; add 0.20¢; Indiana Harbor, Ind., 8; Mansfield, Ohio, 75; Niles, Ohio, 64, 76; Vandergrift, Pa., 1; Warren, Ohio, 4; Zanesville, Ohio, 7.

MERCHANT WIRE PRODUCTS

To dealers, f.o.b. mill	*Base Column Pittsburg, Calif.*
Standard & coated nails* 106	125§
Woven wire fence† 116	139
Fence posts, carloads†† 116	...
Single loop bale ties 113	137
Galvanized barbed wire** 126	146
Twisted barbless wire 126	146

* Pgh., Chi., Duluth; Worcester, 6 columns higher; Houston, 8 columns higher; Kansas City, 12 columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth, Joliet; Johnstown, 112.

	Base per 100 lb	*Pittsburg, Calif.*
Merch. wire, annealed‡	$5.35	$6.30
Merch. wire, galv.‡	5.60	6.55
Cut nails, carloads‡‡	6.75	...

‡ Add 30¢ at Worcester; 20¢ at Chicago; 10¢ at Sparrows Pt.
‡‡ Less 20¢ to jobbers.
§ Torrance, 126.

PRODUCING POINTS — *Standard, Coated or galvanized nails, woven wire fence, bale ties, and barbed wire:* Alabama City, Ala., 4; Atlanta, 65; Aliquippa, Pa. (except bale ties), 5; Bartonville, Ill. (except bale ties), 34; Chicago, 4; Donora, Pa., 2; Duluth, 2; Fairfield, Ala., 11; Johnstown, Pa. (except bale ties), 3; Joliet, Ill., 2; Kokomo, Ind., 30; Minnequa, Colo., 14; Monessen, Pa. (except bale ties), 18; Pittsburg, Calif., 34; Portsmouth, Ohio, 20; Rankin, Pa. (except bale ties), 2; Sparrows Point (except woven fence), 3; Sterling, Ill., 33; San Francisco (except nails and woven fence), 14; Torrance, Calif. (nails only), 24; Worcester (nails only), 2; Houston (except bale ties), 83; Kansas City, 83.

Fence posts: Duluth, 2; Johnstown, Pa., 3; Joliet, Ill., 2; Minnequa, Colo., 14; Moline, Ill., 4; Williamsport, Pa., 51.

Cut nails: Wheeling, W. Va., 15; Conshohocken, Pa., 26; Warehame, Mass., 53.

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier. No. 1 quality, per 100 lb	$3.40
Joint bars, per 100 lb	4.40
Light rails, per 100 lb	3.75

	Base Price cents per lb
Track spikes†	5.60
Axles	5.25
Screw spikes	8.60
Tie plates	4.20
Pittsburg, Torr., Calif.; Seattle	4.35
Track bolts, untreated**	8.85
Track bolts, heat treated, to railroads**	9.10

** Minnequa, deduct 25¢. † Kansas City, 5.85¢.

PRODUCING POINTS—*Standard rails:* Bessemer, Pa., 1; Ensley, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Minnequa, Colo., 14; Steelton, 3.

Light rails: All the above except Indiana Harbor and Steelton, plus Fairfield, Ala., 11; Johnstown, 3; Minnequa, 14.

Joint bars: Bessemer, Pa., 1; Fairfield, Ala., 11; Indiana Harbor, Ind., 8; Joliet, Ill., 1; Lackawanna, N. Y., 3; Steelton, Pa., 3; Minnequa, Colo., 14.

Track spikes: Fairfield, Ala., 11; Indiana Harbor, Ind., 6, 8; Lebanon, Pa., 3; Minnequa, Colo., 14; Pittsburgh, 5; Chicago, 4; Struthers, 6; Youngstown, 4.

Track bolts: Fairfield, Ala., 11; Lebanon, Pa., 3; Minnequa, Colo., 14; Pittsburgh, 77, 78.

Axles: Fairfield, Ala., 11; Gary, 1; Indiana Harbor, Ind., 79; Johnstown, Pa., 3; McKees Rocks, Pa., 1.

Tie plates: Fairfield, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Pittsburg, Calif., 24; Pittsburgh, 4; Seattle, 62; Steelton, Pa., 3; Torrance, Calif., 24; Minnequa, Colo., 14.

Numbers after producing points correspond to steel producers. See key on Steel Price page.

PIPE AND TUBING

Base discounts, f.o.b. mills
Base price, about $200.00 per net ton

Standard, T & C

Steel, Buttweld*	*Black*	*Galv*
½-in.	40½ to 38½	24 to 22
¾-in.	43½ to 41½	28 to 26
1-in.	46 to 44	31 to 29
1¼-in.	46½ to 44½	31½ to 29½
1½-in.	47 to 45	32 to 30
2-in.	47½ to 45½	32½ to 30½
2½ to 3-in.	48 to 46	33 to 31
Steel, lapweld		
2-in.	38	22½
2½ to 3-in.	42	26½
3½ to 6-in.	43 to 40	27½ to 24½
Steel, seamless		
2-in.	36	20½
2½ to 3-in.	39	23½
3½ to 6-in.	41	25½
Wrought Iron, buttweld		
½-in.	+26½	+53
¾-in.	+16½	+42
1 & 1¼-in.	+10½	+33
1½-in.	+ 4½	+29½
2-in.	+ 4	+29
Wrought Iron, lapweld		
2-in.	+13½	+37
2½ to 3½-in.	+11	+32½
4-in.	+ 6	+26½
4½ to 8-in.	+ 8	+28
9 to 12-in.	+18	+37½

Extra Strong, Plain Ends

Steel, buttweld		
½-in.	39½ to 37½	24½ to 22½
¾-in.	43½ to 41½	28½ to 26½
1-in.	45½ to 43½	31½ to 29½
1¼-in.	46 to 44	32 to 30
1½-in.	46½ to 44½	32½ to 30½
2-in.	47 to 45	33 to 32
2½ to 3-in.	47½ to 45½	33½ to 31½
Steel, lapweld		
2-in.	37	22½
2½ to 3-in.	42	27½
3½ to 6-in.	44½ to 41½	30 to 27
Steel, seamless		
2-in.	35	20½
2½ to 3-in.	38	24½
3½ to 6-in.	42½	28
Wrought Iron, buttweld		
½-in.	+22	+47
¾-in.	+15½	+40
1 to 2-in.	+ 5½	+29
Wrought Iron, lapweld		
2-in.	+10½	+33½
2½ to 4-in.	+ 1	+22
4½ to 6-in.	+ 5	+26½
7 & 8-in.	list	+21½
9 to 12-in.	+11½	+29½

For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. *Fontana, Calif., deduct 11 points from figures in left columns.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut lengths 10 to 24 ft inclusive.

OD in in.	gage BWG	Seamless H.R.	Seamless C.R.	Electric H.R.	Electric Weld C.D.
2	13	$20.61	$24.24	$19.99	$23.51
2½	12	27.71	32.58	26.88	31.60
3	12	30.82	36.27	29.90	35.18
3½	11	38.52	45.38	37.36	43.99
4	10	47.82	56.25	46.39	54.56

Prices continued on next page

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, dollars per 100 lb.
(Metropolitan area delivery, add 20¢ to base price except Birmingham, Cincinnati, New Orleans, St. Paul (*), add 15¢; Philadelphia, add 25¢).

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140 Ann.
Baltimore	5.05	6.24–6.44[1]	6.46–6.46[2]	5.58–5.58[11]	....	5.20–5.64[11]	5.49	5.49–5.49[11]	6.19	9.69	9.99	11.12	11.49
Birmingham*	5.05[10]	5.80	6.15[7]	5.10[10]	....	5.20	5.05	5.00[10]	6.73	....	....	....	....
Boston	5.73	6.48[20]–6.85	6.79–7.24[21]	5.78	6.90–6.95	5.88	5.55	5.60	6.30–6.58	9.70–9.97	8.50–10.37	11.15	11.45
Buffalo	5.05	5.80	6.30	5.41	7.27	5.45	5.15	5.05	5.75	9.60	9.90	11.05	11.35
Chicago	5.05	5.80	6.70	5.10	6.80	5.20	5.05	5.00	5.65	9.25	9.55	10.70	11.00
Cincinnati*	5.32–5.97	5.80–6.24	6.29–6.39	5.49	....	5.59–5.74	5.44–5.59	5.39–5.54	6.10–6.25	9.60–9.81	9.90–10.11	11.05–11.26	11.35–11.56
Cleveland	5.05	5.80	6.95	5.24	6.35	5.32	5.17	5.12	5.75	9.36	9.66	10.81	11.11
Detroit	5.33	6.08	7.09	5.49	6.27–6.58	5.59	5.44	5.39	6.03	9.56	9.86	11.01	11.31
Houston	5.75	....	....	6.10	....	6.00	5.95	6.10	7.80	10.35–10.45	10.50–10.60	11.50	11.95–12.10
Indianapolis	....	....	....	....	7.38	....	....	....	....	....	....	....	....
Kansas City	5.65	6.40	7.30	5.70	6.95	5.80	5.65	5.60	6.35	9.85	10.15	11.30	11.60
Los Angeles*	5.80	7.00	7.50[2]	5.85	8.35[16]	5.80	5.70	5.80	7.55	10.05	10.20	11.70	12.10
Memphis	5.93	6.68	....	5.98	6.80	6.08	5.93	5.68	....	....	....	....	....
Milwaukee	5.19	5.94	6.84	5.24	6.32	5.34	5.19	5.14	5.89	9.39	9.69	10.84	11.14
New Orleans*	5.50[1]	6.85[1]	....	5.55[1]	6.90[1]	5.65	5.55[1]	5.55[1]	6.75	....	....	....	....
New York	5.55–5.65	6.54–6.64[1]	6.90–7.05[2]	5.84	6.76[5]	5.70	5.45	5.60	6.44	9.60	9.90	11.05	11.35
Norfolk	6.10	7.00	....	6.30	....	6.15	6.20	6.15	7.20	....	....	....	....
Omaha	....	....	....	....	....	....	....	....	....	....	....	....	....
Philadelphia*	5.30	6.20	6.70[2]	5.65	6.29	5.45	5.25	5.50	6.21	9.35	9.65	10.80	11.10
Pittsburgh	5.05	5.80	6.45	5.20	6.00	5.15	5.05	5.00	5.75	9.25	9.55	10.70	11.00
Portland	6.60–7.10[1]	8.40[2]	8.20[2]	6.85[9]	....	6.40[9]	6.50	6.45–6.45[9]	8.60[14]	12.00[18]	11.60[18]	....	....
Salt Lake City	5.85	6.70	8.75	7.45	8.75	6.10[3]	5.90	7.35[8]	8.75	....	....	....	....
San Francisco	6.25[11]	7.60[2]	7.50[2]	6.75[11]	7.85[16]	6.15[11]	6.00[11]	6.15[11]	7.55	10.05	10.20	11.70	12.10
Seattle	6.60[4]	8.15[2]	8.20[2]–8.35[2]	6.85[4]	....	6.35[4]	6.20[4]	6.35[4]	8.50[14]	....	11.60[18]	....	13.60[18]
St. Louis	5.38	6.13	7.05	5.43	6.68–7.54	5.53	5.38	5.33–5.35	6.08	9.58	9.88	11.03	11.33
St. Paul	5.61	6.36	7.26	5.66	6.16–6.82	5.76	5.61	5.56	6.31	9.81	10.11	11.26	11.58

BASE QUANTITIES: (*Standard unless otherwise keyed on prices.*)
Hot-rolled sheets and strip, hot rolled bars and bar shapes, structural shapes, plate, galvanized sheets and cold-rolled sheets: 2000 to 9999 lb. Cold-finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb.

All HR products may be combined to determine quantity bracket. All galvanized sheets may be combined to determine quantity bracket. CR sheets may not be combined with each other or with galv. sheets to determine quantity bracket.

Exceptions:
(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 to 5999 lb; (6) 1000 lb and over; (7) 500 to 1499 lb; (8) 400 lb and over; (9) 400 to 9999 lb; (10) 500 to 9999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 9999 lb; (16) 6000 lb and over; (17) up to 1999 lb; (18) 1000 to 4999 lb; (19) 1500 to 3499 lb; (20) CR sheets may be combined for quantity; (21) 3 to 24 bundles.

PIG IRON PRICES

Dollars per gross ton. Delivered prices do not include 3 pct tax on freight.

PRODUCING POINT PRICES

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	48.00	48.50	49.00	49.50	.....
Birmingham	41.88	42.38	....	....	.....
Buffalo	46.00	46.50	47.00	....	.....
Chicago	45.00	46.50	46.50	47.00	.....
Cleveland	46.00	46.50	46.50	47.00	51.00
Duluth	46.00	46.50	46.50	47.00	.....
Erie	46.00	46.50	46.50	47.00	.....
Everett	....	50.50	51.00	....	.....
Granite City	47.90	48.40	48.90	.....	.....
Ironton, Utah	46.00	46.50	....	....	.....
Pittsburgh	46.00	46.50	46.50	47.00	.....
Geneva, Utah	46.00	46.50	....	....	.....
Sharpsville	46.00	46.50	46.50	47.00	.....
Steelton	48.00	48.50	49.00	49.50	54.00
Struthers, Ohio	46.00	....	....	....	.....
Swedeland	48.00	48.50	49.00	49.50	.....
Toledo	46.00	46.50	46.50	47.00	.....
Troy, N. Y.	48.00	48.50	49.00	.....	54.00
Youngstown	46.00	46.50	46.50	47.00	.....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Producing Point	Rail Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	.....	50.50	51.00	.....	.....
Boston	Steelton	6.90	.....				60.90
Brooklyn	Bethlehem	4.29	.....	52.79	53.29	53.79	.....
Cincinnati	Birmingham	6.70	48.58	49.08	....	....	.....
Jersey City	Bethlehem	2.63	.....	51.13	51.63	52.13	.....
Los Angeles	Geneva-Ironton	7.70	53.70	54.20	....	....	.....
Mansfield	Cleveland-Toledo	3.33	49.33	49.83	49.83	50.33	54.33
Philadelphia	Bethlehem	2.39	50.39	50.89	51.39	51.89	.....
Philadelphia	Swedeland	1.44	49.44	49.94	50.44	50.94	
Philadelphia	Steelton	3.09	.....	.....	.....	.....	57.09
Rochester	Buffalo	2.63	48.63	49.13	49.63	.....	.....
San Francisco	Geneva-Ironton	7.70	53.70	54.20	.....	.....	.....
Seattle	Geneva-Ironton	7.70	53.70	54.20	.....	.....	.....
St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65	.....	.....
Syracuse	Buffalo	3.58	49.58	50.08	50.58	.....	.....

Producing point prices are subject to switching charges; silicon differential (not to exceed 50c per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct for foundry iron); phosphorus differentials, a reduction of 38c per ton for phosphorus content of 0.70 pct and over manganese differentials, a charge not to exceed 50c per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.01 to 6.50 pct C/L per g.t., f.o.b. Jackson, Ohio—$57.00; f.o.b. Buffalo, $58.25. Add $1.00 per ton for each additional 0.50 pct Si up to 17 pct. Add 50c per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $60.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, $68.56. High phosphorus charcoal pig iron is not being produced.

ARMSTRONG *Drop Forged* EYE BOLTS

They'll Carry the Load

Specify ARMSTRONG Drop Forged Eye Bolts for extra strength — correctly engineered proportions, forged-in quality, uniformity of design in all sizes and the best mild steel, heat treated to increase tensile strength. Built to tool standards, not hammered out as "tonnage" forgings, they always carry their load safely.

Stocked by Armstrong distributors with or without shoulders, threaded or as blanks in 16 sizes (openings from ¾" to 4" i.d.).

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Weldimatic Welding Torch "W-46", with built-in automatic Gasaver. Time study in auto plants showed an average gas savings per man of $4.80 per day with this Weldit Torch. Weighs only 13 ounces. No operator's fatigue.

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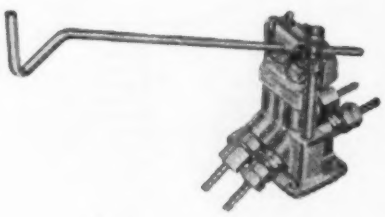
... has been in continuous use throughout the world for over 20 years — slashing fuel costs, lessening fire hazards and improving safety conditions.



Weldimatic Blow Pipe "C-47", with automatic shut-off fashioned of special aluminum alloy. Features lightness of weight and fine balance. For soldering, annealing and heating jobs. Uses natural or manufactured gas, butane, and other low temperatured gasses and compressed air.

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992 OAKMAN BLVD. **Weldit** INC. SINCE 1918 DETROIT 6, MICH.

Continued

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts, f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago) Base discount

Machine and Carriage Bolts

	Pct Off List Less Case	C.
½ in. & smaller x 6 in. & shorter	27	38
9/16 & ⅝ in. x 6 in. & shorter	29	40
¾ in. & larger x 6 in. shorter	26	37
All diam, longer than 6 in.	22	34
Lag, all diam over 6 in. & longer	28	39
Lag, all diam x 6 in. & shorter	30	41
Plow bolts	40	—

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	25 27
9/16 to ⅝ in.	23 35
¾ to 1½ in. inclusive	23 35
1⅝ in. and larger	16 29

Semifinished Hexagon Nuts

(Less case lots)

	Pct Off List Reg	Hvy	Lt
½ in. and smaller	41	35	41
9/16 to ⅝ in.	36	30	36
¾ to 1½ in.	31	27	33
1⅝ in. and larger	21	17	..

In full case lots, 15 pct additional discount.

Stove Bolts

	Pct Off List
Packaged, steel, plain finish	63
Packaged, plated finish	50
Bulk, plain finish**	69*

* Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

** Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Large Rivets

(½ in. and larger) Base per 100 lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham, Lebanon, Pa. $7.25

Small Rivets

(7/16 in. and smaller)

	Pct Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	43

Cap and Set Screws

(In bulk)	Pct Off List
Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	60
¼ in. through ⅝ in. x 6 in. and shorter high C heat treated	54
Milled studs	23
Flat head cap screws, listed sizes	24
Fillister head cap, listed sizes	43
Set screws, sq head, cup point, 1 in. diam and smaller x 6 in. and shorter	59

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon	4.15¢
0.41 to 0.60 carbon	5.95¢
0.61 to 0.80 carbon	6.55¢
0.81 to 1.05 carbon	8.50¢
1.06 to 1.35 carbon	10.80¢

Worcester, add 0.30¢.

LAKE SUPERIOR ORES

(51.50% Fe; natural content, delivered lower lake ports)

	Per gross ton
Old range, bessemer	$8.10
Old range, nonbessemer	7.95
Mesabi, bessemer	7.85
Mesabi, nonbessemer	7.70
High phosphorus	7.70

After Jan. 25, 1950, increases or decreases in Upper Lake rail freight, dock handling charges and taxes are for buyers' account.

ELECTRODES

Cents per lb., f.o.b. plant, threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb
	GRAPHITE	
17, 18, 20	60, 72	16.00¢
8 to 16	48, 60, 72	16.50¢
7	48, 60	17.75¢
6	48, 60	19.00¢
4, 5	40	19.50¢
3	40	20.50¢
2½	24, 30	21.00¢
2	24, 30	23.00¢
	CARBON	
40	100, 110	7.50¢
35	65, 110	7.50¢
30	65, 84, 110	7.50¢
24	72 to 104	7.50¢
20	84, 90	7.50¢
17	60, 72	7.50¢
14	60, 72	8.00¢
10, 12	60	8.25¢
8	60	8.50¢

CLAD STEEL

Base prices, cents per pound, f.o.b. mill

Stainless-carbon	Plate	Sheet
No. 304, 20 pct, Coatesville, Pa. (21)	*26.50	
Washgtn, Pa. (39)	*26.50	
Claymont, Del. (29)	*26.50	
Conshohocken, Pa. (26)		*22.50
New Castle, Ind. (55)	*26.50	*24.00
Nickel-carbon 10 pct, Coatesville (26)	27.50	
Inconel-carbon 10 pct, Coatesville (21)	36.00	
Monel-carbon 10 pct, Coatesville (21)	29.00	
No. 302 Stainless-copper-stainless, Carnegie, Pa. (60)		75.00
Aluminized steel sheets, hot dip, Butler, Pa. (7)		7.75

*Includes annealing and pickling, or sandblasting.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.00
18	4	1	—	5	$1.5665
18	4	2	—	—	$1.13
1.5	4	1.5	8	—	71.5¢
6	4	2	6	—	76.5¢

High-carbon-chromium ..... 57.5¢
Oil hardened manganese..... 32¢
Special carbon ..... 29.5¢
Extra carbon ..... 24.5¢
Regular carbon ..... 21¢

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	$14.00 to $14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.00 to $16.50
Foundry, oven coke	
Buffalo, del'd	$24.00
Chicago, f.o.b.	21.00
Detroit, f.o.b.	20.40
New England, del'd	23.40
Seaboard, N. J., f.o.b.	22.00
Philadelphia, f.o.b.	21.25
Swedeland, Pa., f.o.b.	21.20
Painesville, Ohio, f.o.b.	21.90
Erie, del'd	$21.04 to 21.25
Cleveland, del'd	22.62
Cincinnati, del'd	22.71
St. Paul, f.o.b.	21.00
St. Louis, del'd	21.60
Birmingham, del'd	20.20

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill. Base price, per ton net: Effective CaF, content:

70% or more $37.00
60% or less 34.00

Prices Continued on Next Page

Yes, but *when* are stainless steel prices coming down so that we can lower our costs and still show a profit?

Right *now*. We can *cut your costs* up to 30%. How? WRITE TODAY!

Submit specifications on sheet, strip, rod, wire and tubing. Large stocks in principal cities.

DEPENDABLE Sales CORPORATION
315 Gold St., Brooklyn 1, N. Y.

KRANE KAR
DOES 101 JOBS AT WEIRTON STEEL

KRANE KAR swings loads to either side

KRANE KAR handles spare blooms for Blooming Mill, large slabs for Rolling Mill, charge boxes in Open Hearth, bars in Cold Drawn Bar Mill (finally loads them into railroad cars), changes rolls and bumper plates in Steel Strip Mill, and stands by to relieve heavy duty overhead cranes; transports all kinds of loads in Machine Shop, Construction and Maintenance Depts. With clamshell bucket, KRANE KAR moves sand in Welding and Foundry Depts., and coke in Coke Dept. *Ask for illustrated Bulletin 89—"How Metalworking Plants Reduce Materials Handling Costs."*

Gas or diesel, 12 to 37 ft. booms or adjustable telescopic booms; solid or pneumatic rubber tires. Buckets, magnets, and other accessories available.

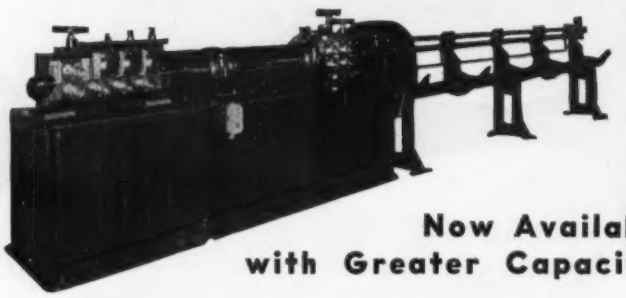
THE ORIGINAL SWING BOOM MOBILE CRANE WITH FRONT-WHEEL DRIVE AND REAR-WHEEL STEER
1½, 2½, 5, AND 10 TON CAPACITIES
KRANE KAR
TRADE MARK REGISTERED

USERS: Carnegie-Illinois, U.S. Steel, Bethlehem, Youngstown S & T, Basic Magnesium, Lima Locomotive, General Motors, Pullman Standard, etc.

SILENT HOIST & CRANE CO., 851 63rd ST., BROOKLYN 20, N.Y.

The Straightener That Cuts Accurate Lengths!

SHUSTER



Now Available with Greater Capacity!

Type 3A now straightens wire from ¼" to ½" dia., 9/16" in basic wire. Type 4A (similar to illustration) handles diameters from ⅜" to ⅝", 11/16" in basic wire. Other advantages are:

- Almost continuous wire travel
- Lightning cut-off assures square-cut ends
- High speed, direct driven 5-die straightening flier
- Quiet, highly efficient V-belt motor drive
- Ball and roller bearings throughout

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For Safe and Economical Results, Use . . .

-Preformed-

"HERCULES" (RED-STRAND) WIRE ROPE

The experience of many wire rope users has proved that they can depend on Preformed "Hercules" (Red-Strand) Wire Rope for top-flight performance. Its easy handling . . . its smooth spooling . . . its unusual endurance — make for faster work, longer life and lower operating cost.

We Invite Your Inquiries

"HERCULES" (RED STRAND) the DEPENDABLE WIRE ROPE for any TOUGH JOB

MADE ONLY BY

A. LESCHEN & SONS ROPE CO.

ESTABLISHED 1857

5909 KENNERLY AVENUE • ST. LOUIS 12, MISSOURI

Birmingham 6 New York 6 Los Angeles 21 Houston 3 Chicago 7 Denver 2 San Francisco 7 Portland 9 Seattle 4

REFRACTORIES (*F.o.b. works*)

	Carloads, Per 1000
Fire Clay Brick	
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5)	$86.00
No. 1 Ohio	80.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	80.00
No. 2 Ohio	72.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	14.00
Silica Brick	
Mt. Union, Pa., Ensley, Ala.	$86.00
Childs, Pa.	90.00
Hays, Pa.	91.00
Chicago District	95.00
Western Utah and Calif.	101.00
Super Duty, Hays, Pa., Athens, Tex., Chicago	106.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	15.00
Silica cement, net ton, bulk, Hays, Pa.,	17.00
Silica cement, net ton, bulk, Ensley, Ala.	16.00
Silica cement, net ton, bulk, Chicago District	16.00
Silica cement, net ton, bulk, Utah and Calif.	22.50
Chrome Brick	*Per Net Ton*
Standard chemically bonded, Balt., Chester	$69.00
Magnesite Brick	
Standard, Baltimore	$91.00
Chemically bonded, Baltimore	80.00
Grain Magnesite	*St. ⅜-in. grains*
Domestic, f.o.b. Baltimore, in bulk fines removed	$56.00 to $57.00
Domestic, f.o.b. Chewelah, Wash., in bulk	33.00
in sacks	38.00
Dead Burned Dolomite	
F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢	$12.25

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	7.4¢ to 9.0¢
Canadian sponge iron, del'd, in East	10.00¢
Domestic sponge iron, 98+% Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	31.5¢ to 39.5¢
Electrolytic iron unannealed, minus 325 mesh, 99+% Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	70.0¢ to $1.35
Aluminum	31.50¢
Brass, 10 ton lots	23.50¢ to 27.25¢
Copper, electrolytic	27.75¢
Copper, reduced	27.00¢
Cadmium, 100-199 lb	$2.95
Chromium, electrolytic, 99% min., and quantity	$3.50
Lead	17.00¢
Manganese	52.00¢
Molybdenum, 99%	$2.65
Nickel, unannealed	56.00¢ to 66.00¢
Nickel, annealed	72.00¢
Nickel, spherical, unannealed	69.00¢
Silicon	34.00¢
Solder powder	8.5¢ plus metal values
Stainless steel, 302	75.00¢
Tin	85.75¢
Tungsten, 99%	$2.90
Zinc, 10 ton lots	15.75¢ to 18.50¢

CAST IRON WATER PIPE

	Per net ton
6 to 24-in., del'd Chicago	$91.80 to $95.30
6 to 24-in. del'd N. Y.	91.00 to 92.00
6 to 24-in., Birmingham	78.00 to 82.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less	$108.50 to $113.00

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

FERROALLOYS

Ferromanganese

78-82% Mn. maximum contract base price, gross ton, lump size.

F.o.b. Birmingham	$174
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont.	$172
F.o.b. Johnstown, Pa.	$174
F.o.b. Sheridan, Pa.	$172
F.o.b. Etna, Clairton, Pa.	$175

$2.00 for each 1% above 82% Mn, penalty, $2.15 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.45
Ton lots	12.05

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$64.00	$65.00
Pgh. or Chicago	65.00	66.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, packed	35.5
Ton lots	37.0

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	28
Ton lots	30
Less ton lots	32

Medium Carbon Manganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb. of contained Mn ..... 18.15¢

Low-Carbon Manganese

Contract price, cents per pound Mn contained, lump size, delivered.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	25.25	27.10	28.30
0.10% max. C	24.75	26.60	27.80
0.15% max. C	24.25	26.10	27.30
0.30% max. C	23.75	25.60	26.80
0.50% max. C	23.25	25.10	26.30
0.75% max. C, 7.00% max. Si	20.25	22.10	23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

Carload bulk	8.95
Ton lots	10.60
Briquet, contract basis carlots, bulk delivered, per lb of briquet	10.30
Ton lots	11.90

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $77.00 gross ton, freight allowed to normal trade area; Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $73.50. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	20.70
97% Si, 1% Fe	21.10

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 1 lb Si briquets.

Carload, bulk	6.30
Ton lots	7.90

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

25% Si	17.00	75% Si	13.50
50% Si	11.30	85% Si	14.65
90-95% Si			16.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Prices Continued on Next Page

The ABC of MST

Michigan

The Modern Electric Resistance

WELDED

STEEL TUBING

ROUND

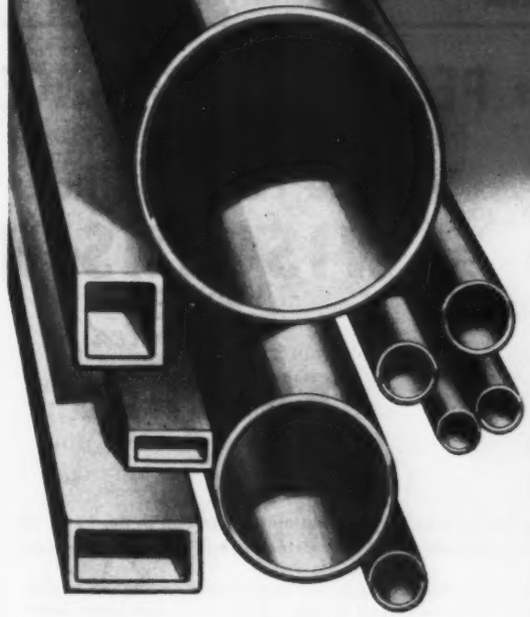
⅛" to 4" O. D. 9 to 22 gauge

SQUARE-RECTANGULAR

½" to 2" 20 gauge

1" to 2½", 14, 16, 18 gauge

A LWAYS MAKES POSSIBLE
B ETTER PRODUCTS
C AT LOWER OST



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A Quality Product, can be worked in your plant or prefabricated by MICHIGAN.

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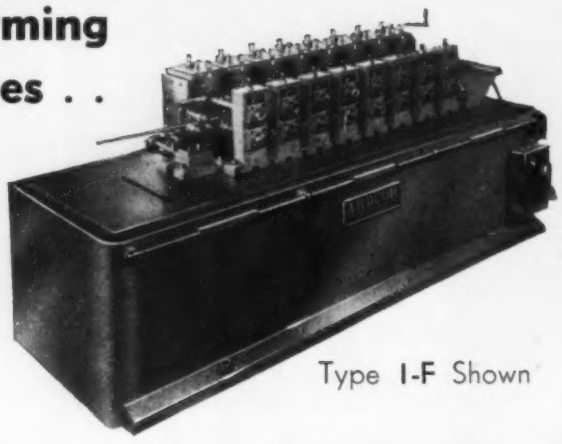
ARDCOR

Roll Forming Machines . .



Type 1-F Shown

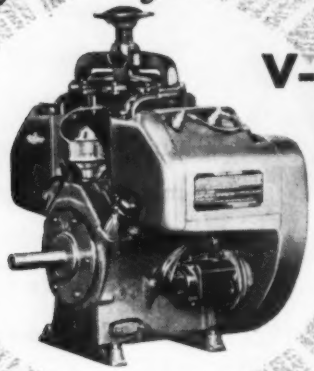
ARDCOR All Steel Constructed Roll Forming Machines are built in standard sizes to take material up to 50 inches in width and ⅜ inches thick. Consult our engineering department without obligation.

ARDCOR SPECIALTIES

ARDCORLOY ROLLER DIES ● ROLL FORMING MACHINERY ● FLYING SHEAR
AND CUT-OFF MACHINES ● CRADLE REELS ● SPECIAL PRODUCTION MACHINERY

American ROLLER DIE CORPORATION
20650 St. Clair Avenue • Cleveland 17, Ohio

Preferred for **PEAK PERFORMANCE**
15 TO 30 H.P.
V-Type Four-Cylinder
WISCONSIN
HEAVY-DUTY
Air-Cooled
ENGINES



Model VE-4, V-type 4-cylinder standard engine 21.5 hp. at 2400 rpm.

On power jobs that call for rugged serviceability and sustained operation in the 15 to 30 hp. range, Wisconsin 4-cylinder engines rate *first preference* on the basis of such features as:

Trouble-free Air-Cooling at all temperatures from sub-zero to tropical highs; tapered roller bearings at BOTH ends of the extended crankshaft to take up all thrust and radial loads (also inherently self-cleaning); rotary type, high tension OUTSIDE Magneto equipped with Impulse Coupling for quick starting in any weather and sure firing on the job; individual oil stream to each connecting rod (other parts lubricated by oil spray) assuring complete and thorough lubrication at all times.

V-type design permits a shorter crankshaft and less height than with a "straight-in-line" engine, assuring a more compact power unit.

4-cycle single cylinder models, 3 to 9 hp., and 2-cylinder models, 7 to 13 hp., also available. Detailed data on request.

WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 14, WISCONSIN

Ferrochrome

Contract prices, cents per pound contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max Si.)

0.06% C	28.75	0.20% C	27.75
0.10% C	28.25	0.50% C	27.50
0.15% C	28.00	1.00% C	27.25
2.00% C			27.00
65-69% Cr, 4-9% C			20.50
62-66% Cr, 4-6% C, 6-9% Si.			21.35

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

Chromium Metal

Contract prices, per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.20% max. C	$1.09
0.50% max. C	1.05
9.00 min. C	1.04

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 20.50¢ per lb of contained Cr plus 11.30¢ per lb of contained Si.

Bulk 1-in. x down, 20.65¢ per lb contained Cr plus 11.50¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	17.90
Ton lots	21.00
Less ton lots	22.50

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

CMSZ

Contract price, cents per pound of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	19.75
Less ton lots	21.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	15.75¢
Less ton lots	17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	17.00¢
Ton lots to carload packed	18.00¢
Less ton lots	19.50¢

SMZ

Contract price, cents per pound of alloy, delivered. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.85
Less ton lots	18.50

Continued

Other Ferroalloys

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	7.65¢
Ton lots	9.05¢
Calcium molybdate, 45-40%, f.o.b. Langeloth, Pa., per pound contained Mo	96¢
Ferrocolumbium, 50-60%, 2 in x D, contract basis, delivered, per pound contained Cb.	
Ton lots	$3.50
Less ton lots	3.55
Ferro-Tantalum-columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta	$2.67
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo	$1.13
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton	$65.00
10 tons to less carload	75.00
Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti	$1.28
Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti	$1.40
Less ton lots	1.45
Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton	$160.00
Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered	$2.25
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained V.	
Openhearth	$2.90
Crucible	3.00
High speed steel (Primos)	3.10
Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa.	95¢
bags, f.o.b. Washington, Pa., Langeloth, Pa.	94¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk, lump	11.00¢
Ton lots, bulk, lump	11.50¢
Less ton lots, lump	12.25¢
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2O_5	$1.20
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.	
Carload, bulk	6.60¢

Boron Agents

Contract prices, per lb of alloy, del.	
Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	$4.25
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, f.o.b. Suspension Bridge, N. Y.; freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.	
Ton lots, per pound	8.625¢
Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots	$1.20
F.o.b. Wash., Pa.; 100 lb, up	
10 to 14% B	.75
14 to 19% B	1.20
19% min. B	1.50
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	93¢
No. 6	63¢
No. 79	45¢
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.	
Ton lots	$1.67
Less ton lots	1.79
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	$1.80
Silcaz, contract basis, delivered.	
Ton lots	45.00¢

SNAG FASTER for LESS MONEY!

K-372

You can remove more metal in less time, for less money, and do a better job, if you have the efficient and economical combination of the right snagging wheels and the *right* machines.

Experience proves that old machines converted to higher speeds are usually costly, often dangerous, and seldom meet the exacting requirements for quality of workmanship and quantity of output that are necessary to a competitive position today. Electro Field Engineers know the right combination of Electro *HIGH-SPEED* resin-bonded Grinding Wheels and the right machine for the scheduled job.

•

Why not accept their help? Their cooperation will cost you nothing. It will place you under no obligation. Just tell us with whom in your organization, our Electro Field Engineer may talk; and if you request it when you write, phone or wire, we will gladly send you free a copy of our 64-page High Speed Grinding Manual. Electro Refractories & Alloys Corporation, 344 Delaware Ave., Buffalo 2, N. Y.

Electro SINCE 1919

HIGH-SPEED GRINDING WHEELS
•
CRUCIBLES
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STOPPERS
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High Temperature CEMENTS
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Pangborn

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American Cladmetals Makes Seamless Rosslyn Metal Tubing

Carnegie, Pa.—Cold drawn seamless tubing of Rosslyn Metal, copper core with stainless steel surfaces, has been successfully accomplished by American Cladmetals Co.

The first seamless tubing made of Rosslyn consisted of a section of 1½ in. OD (outside diameter) by .50 wall. Successful drawings in other sizes have since been made. The size range is expected to be from ⅜ in. to 1½ in. OD and from .020 to .078 in wall thickness.

Seamless tubing is generally made from a pierced billet. Rosslyn Metal seamless tubing is made by first drawing a tube hollow or tube billet from a flat sheet. Successive draws and anneals are employed until a tube hollow 2⅜ in. OD by 18 in. long and approximately ⅛ in. thick is produced.

This tube hollow is then redrawn by conventional methods to thin wall seamless tubing. Sizes available are from ⅜ in. to 1½ in. OD with a wall thickness from .078 to as light as .020. The maximum weight for a piece of tubing at the present time is about 5 lbs.

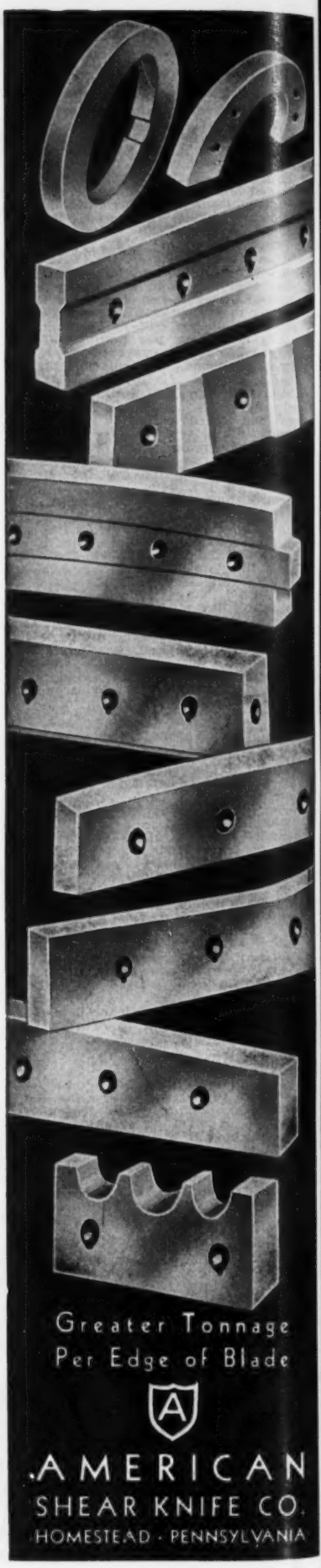
M. A. Hanna Quarterly Earnings

Cleveland—Net profit of $1,631,967 for first quarter of 1950 was reported by M. A. Hanna Co. after all charges, including depreciation and depletion and estimated provision for federal income taxes.

The profit is equal after preferred dividend requirements to $1.49 a share on the 1,030,464 common shares. In the first quarter of 1949 net profit was $1,487,176, equivalent to $1.35 a common share.

Coal Earnings Plunge

Pittsburgh — Pittsburgh Consolidation Coal Co. earnings for the first quarter of 1950 were $822,551, as compared with $3,980,673 for the first quarter of 1949. Net sales and operating revenues were $31,539,725. Earnings retained in the business as of March 31 were $45,539,078.



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Presses
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Drill Presses
Riveters
Slitters
Wire Formers
Profilers
Tappers
Roll Formers
Gear Cutters

Shears
Bolt Cutters
Forging Equipt.
Thread Millers
Spot-Arc Welders
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Saws
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Lapping Machs.
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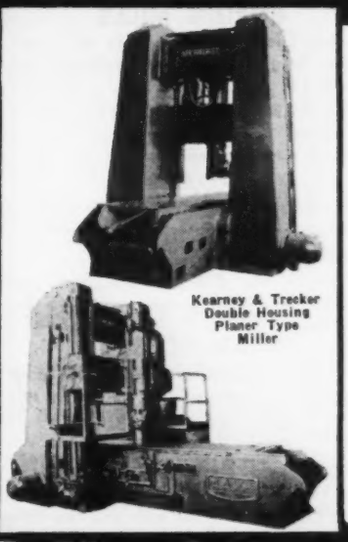
Nail Machines
Welders
Headers



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1000 Cu. Ft. Worthington "Feather Valve," 18" x 11" x 14" two stage with 185 HP synchronous motor on shaft.

AUTOMATIC

4⅜" Conomatic 4 spindle, serial No. 2191K with, reel, chip conveyor, extra equipment.

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4½ bar Lucas No. 33. Table 46" x 64" Max. height 36", Max. to outboard support 11'.

100" Niles Bement Pond. Extra heavy type. 2 swivel heads, power rapid traverse, 35 HP direct current motor.

BROACH

15 ton 36" stroke American vertical duplex surface with tilting type workholder.

DRILL

42 spindle, No. B16 Natco multiple with 18" x 48" drilling area and two box tables.

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Type T Barber Colman. Designed for either straight or taper splines, helical or spur gears. Also type A and Nos. 3 & 12 Barber Colmans.

GRINDERS

6" x 18", No. 10 Brown & Sharpe "Electric Hydraulic" Three with and two without spindle oscillation. New 1940 and 1941.

10" x 36" Norton type C hydraulic with hydraulic quick in-feed. Serial No. C16458, new in 1942.

10" x 72" Norton type C hydraulic made at factory to swing 14". Serial No. 21750, new in 1944.

23" x 36" Norton type C with mechanical table traverse, hydraulic quick in-feed. Serial No. C18281, new 1943.

LATHE TURRET

No. 2FU Foster Fastermatic Serial No. 2FU529, new in 1944. Quite a little tooling.

MILLERS

Cincinnati Hydromatic Sizes: 3-24, 34-36, 4-36, 4-48, 5-48, 56-72 and 56-90.

PRESSES

1000 ton, No. 666 Toledo knuckle joint Coining. 2½" stroke, 18" shut height, bed 37" F to B x 31" R to L.

350 ton Clearing Crankless, model F1350-42, serial No. 45-11155P, new 1945. 20" stroke, 28" shut height, 36" x 42" bed.

600 ton Hamilton No. 2316½ eccentric shaft forging. Stroke 4"; shut height 16" bed 28" F to B x 23¾" R to L.

No. 506 Bliss on inclined legs with double roll feed and scrap cutter. About 126 tons. 3" stroke, 11½" shut height.

1000 ton Baldwin Southwark "Hy-Speed" hydraulic. 20" stroke, 56" daylight, bed 42" F to B x 54" R to L.

UPSETTERS

2" National. Serial No. 13213. Has suspended slides with long overarm guide. Has 15 HP motor.

4" Ajax. Serial No. 3156. Has twin drive gears, suspended slides, self contained backshaft, 30 HP motor.

MILES MACHINERY CO.
SAGINAW, MICH.

THE CLEARING HOUSE

NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Boston to be host of 17th annual NISA convention, June 4 to 7

Head of ECA machinery division to speak at MDNA convention, May 10 to 12

Members of Chicago MDNA unanimously reelect present officers

New England NISA Chapter Sponsors Annual Convention

Boston — The 17th annual convention of the National Industrial Service Assn. will be held from June 4 to 7 at the Boston Statler. The New England chapter, sponsors of the convention, have made plans for three business sessions, three open forums, and various inspection tours.

The daytime meetings will feature talks on topics of interest to NISA members by prominent business leaders. At the forums, NISA members will deliver technical and administrative papers.

The evening social activities will include a dinner dance at the Boston Latin Quarter, a Boston Pops concert at Symphony Hall and the concluding banquet at the Statler Hotel. For the ladies, there will be an all day tour of historical Boston, Lexington, and Concord with luncheon at Longfellow's Wayside Inn. There will also be an afternoon tour of the Isabella Stewart Gardner Museum, and afternoon canasta and bridge tournaments.

Knutson of ECA to Speak At MDNA Detroit Convention

Chicago—The principal speaker at the MDNA annual convention to be held in Detroit, May 10 to 12 will be George H. Knutson, Chief of The Machinery Branch of the ECA Industry Division, according to J. M. P. Fox, executive director of the MDNA. Mr. Knutson will speak on the ECA and how it affects machinery dealers.

Mr. Fox stated that there will be an effort made at the national meeting to strengthen the existing bylaws of the association. He wants the requirements for membership to be stricter as regards guarantees and representations of used machinery.

He would like to see a resolution adopted at the convention that would guarantee as represented all used machinery exports to Marshall Plan and other foreign countries. To do this, MDNA dealers would have to have a certification of inspection on all export items. The inspection would be made by an independent inspection service as Hunt Inspection Service, Lloyd's or the Bureau Veritas.

Another principal speaker at the convention will discuss the rebuilding and distribution of used machinery in the United States.

Chicago MDNA Reelects Officers for Another Year

Chicago—Members of the Chicago Chapter of the MDNA voted unanimously to reelect the present officers of the chapter for another year. It was the feeling of the 26 members present at the meeting held on Apr. 20, that a 2-year term of office would enable the present officers to continue the good work they were doing in promoting the interests of the local chapter. Edwin Johnson of the Strom-Johnson Machinery Co. was reelected chairman, Harold Goldstein of Machinery & Electric Motors Co. was reelected vice-chairman and Harold Lapedus of Adams Machinery Co. was reelected secretary.

A motion that member dealers stay closed on Saturdays during

Turn to Page 182

LIQUIDATION

Liquidating Hot Sheet Mill Equipment of Nationally Known Steel Company

1—5 stand hot mill train. Complete.
1—Allis Chalmers 1500 H.P. motor, 3 phase, 60 cycle, 507 R.P.M. Complete with control.
1—Falk 1500 H.P. Gear Reducer, Type S-14, S-15-A. Ratio 6.1.
2—Sets Wean Roller and Catcher Tables.
2—Continuous pair furnaces.
1—Continuous sheet furnace.
2—Wean automatic doublers, water cooled cast iron floor plates.

Miscellaneous items including: shears, alloy pickling equipment, scrubbers, conveyors, driers, and large assortment of new spare parts for all operating units.

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No. 16A-16" Bryant, m.d., latest
No. 16-22" Bryant, m.d., latest
No. 16RS Bryant, m.d., latest
No. 16-38" Bryant, m.d., latest
No. 9 Cincinnati, belt
No. 6, 10, 20 Bryant, belt
No. 24-21" Bryant, m.d., late
No. 24-36" Bryant, m.d., latest
No. 49 Heald Single End Borematic, m.d.
No. 70 Heald, belt
No. 72A Heald Plain, m.d.
No. 72A Heald Gagematic, m.d.
No. 72A3 Heald Sizematic, m.d.
No. 72A3 Heald Gagematic, m.d.
No. 72A5 Heald Sizematic, m.d.
No. 72A5 Heald Plain, m.d.
No. 72A5 Heald Plain, long bed type, m.d., latest
No. 72A5 Heald Universal Internal, m.d., latest
No. 73 Heald, m.d, brand new, latest
No. 74 Heald, m.d.
No. 104 Rivett, m.d., latest
No. 174 Heald Gap, m.d., latest
No. 649-16 Van Norman Automatic Oscillating Radius, m.d., latest
Series 5—No. 5 Bryant, m.d., latest

SURFACE GRINDERS
No. 2 Brown & Sharpe, m.d., late
No. 2 Brown & Sharpe, belt drive
No. 120-30"x120" Hanchett Horizontal Spindle Plano Type, Model OS, m.d.
No. 76 Van Norman Automatic Piston Turning & Grinding Machine, m.d.
Arter Model A-1-8" Rotary, m.d.
No. 11 Blanchard Vertical, m.d., 16" chuck
No. 16 Blanchard Rotary, m.d., 26" chuck
No. 22—12" Heald Rotary, m.d.
No. 25A—16" Heald Rotary, m.d., latest
No. 25A—24" Heald Rotary, m.d., latest
No. 33 Abrasive Vertical, m.d.
No. 78 Covell-Hanchett Hydraulic, m.d.
No. 260—16" Heald Rotary, belt
10x12x60" Norton Hydraulic Surface, m.d., latest
14" Pratt & Whitney Vertical, m.d.
12" Pratt & Whitney Vertical, m.d.
24" Bridgeport Knife, belt
14" Diamond H.D. Face Grinder, m.d.

HONING MACHINES
H1 Micromatic Horizontal Hydrohoner, m.d.
H4 Micromatic Horizontal Hydrohoner, m.d.
No. 6 Barnes Twin Spindle Honing Machine, m.d.

TOOL & CUTTER GRINDERS
No. 2 Cincinnati, m.d., latest
No. 2 LeBlond Universal, m.d.
No. 10 Brown & Sharpe, m.d., latest
No. 13 Brown & Sharpe, m.d., latest
Cincinnati Monoset, m.d.
Sterling Tool & Cutter, m.d.
Gleason Cutter, m.d.
No. 2B Sellers Drill, m.d.
No. 12M Grand Rapids Tap, m.d.
No. 4T Sellers Tool, m.d., latest
No. 6T Sellers Tool, m.d., latest
No. 51 Oliver Drill Pointer, m.d.
1½ H.P. Grand Rapids Doubles End Drill Grinder

MANUFACTURING LATHES
No. 3A Lodge & Shipley Duomatic, m.d., late type
No. 4 LeBlond Boring Lathe, 37' bed, 13" hole
No. 9, 12 LeBlond Multi-Cut, m.d.
3½x36", 3½x80", 4x60", 8x84" LoSwing, m.d.
8x132" LoSwing, m.d., latest
9x12" Sundstrand, s.p.d.
11x18" LeBlond Rapid Production, m.d.
12x18" centers Monarch Model 5T, m.d.
13"x24" LeBlond Rapid Productiion, Timken, latest
13"x24" Coulter Automatic Threading, m.d.
13"x36" LeBlond Rapid Production, Timken, latest
13"x48" Coulter Automatic Threading, m.d.
16"x6' LeBlond Rapid Production, m.d.
16"x6' Lodge & Shipley Simplified Mfg., cone, motorized
17"x6' LeBlond Automobile Mfg., cone
17"x8' LeBlond Automobile Mfg., cone
20"x8' LeBlond Mfg., m.d.
21"x8' LeBlond Turret Lathe, cone
Niles-Bement-Pond Quartering Machine, m.d., new
Schauer Type NA 2B Speed Lathe, m.d.

MANUFACTURING TYPE MILLING MACHINES
No. 0 Sundstrand Rigidmill, m.d., latest
No. 08 Cincinnati Model E.A., m.d., latest
No. 12 Brown & Sharpe, m.d.
No. 1-12 Cincinnati, m.d., latest
No. 1-18 Cincinnati, m.d., latest
No. 2-18 Cincinnati, m.d., with rise and fall, latest
No. 2-24 Cincinnati, m.d., latest
No. 2-24 Cincinnati, m.d., with rise and fall, latest
No. M24 Kearney & Trecker Production, m.d., latest
No. 4-48 Cincinnati Plain Hydromatic, m.d., latest
No. 4-48 Cincinnati Duplex Hydromatic, m.d., latest
No. M30 Milwaukee, m.d., latest
No. 34-36 Cincinnati Duplex Hydromatic, m.d., with tracer control, latest
No. 34-36 Cincinnati Plain Hydromatic, m.d., with tracer control, latest
No. 56-72 Cincinnati Duplex Hydromatic, m.d., latest
No. 56-90 Cincinnati Duplex Hydromatic, m.d., latest
No. 1836 Milwaukee Duplex, m.d., late
Type P Ohio Mfg., m.d.
Sundstrand Rigidmill, m.d.
4" Pratt & Whitney Spline, m.d.
No. 33 Kempsmith Mfg., s.p.d.
18", 24" Cincinnati Plain Automatic, m.d.
24", 48" Cincinnati Duplex Automatic, m.d.
30"x36'x12' Ingersoll Slab Milling Machine, 2 heads, m.d.
72"x6' Ingersoll Single Horizontal Spindle Traveling Housing Milling Machine, m.d.

THREAD MILLING MACHINES
U6 Automatic Hob, m.d.
No. CT-36 Lees-Bradner, m.d., latest
No. CT-54 Lees-Bradner, m.d., latest
Hall Planetary, m.d.
4½x12", 6x14", 6x20", 6x48", 6x80" Pratt & Whitney
10x24" Hanson Whitney, m.d., latest
10x48" Hanson Whitney, m.d.

HAND MILLING MACHINES
United States, vee belted, m.d.
No. 1 Kent-Owens, m.d.
Atlas Model MF Bench, m.d.
No. 1 Standard, m.d.
No. 2 Productomatic, m.d.

PLAIN MILLING MACHINES
No. 000 Brown & Sharpe, m.d., latest
No. 1A Milwaukee, m.d.
No. 1M Cincinnati, m.d.
No. 1 Special Plain Kearney & Trecker Milwaukee, m.d.
No. 1½, 2, 3 Cincinnati, cone
No. 2B Brown & Sharpe, m.d., latest
No. 2 Cincinnati H.S. Dial, m.d., latest
No. 2 Rockford, m.d.
No. 3 Cincinnati, m.d., latest
No. 3B Brown & Sharpe, m.d., late
No. 3, 4 Kempsmith Maxi-Miller, m.d.
No. 3B Milwaukee, m.d.
No. 3 Van Norman Duplex, s.p.d.
No. 4 Cincinnati H.P., m.d.
No. 4 Ohio, cone
No. 5 Cincinnati, rect. overarm, m.d.
No. 5 H.D. LeBlond, s.p.d.
No. 5B Brown & Sharpe Heavy, m.d.

We carry an average stock of 2,000 machines in our 11 acre plant at Cincinnati. Visitors welcome at all times.

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5" UPSETTERS
5" National High Duty Upsetting & Forg. Mach. Air friction clutch; side shear; auto. lubricating system; jib crane; 60 H.P. motor; V-belt drive
5" Ajax Heavy Duty Air Friction Clutch Upsetter; underarm header and grip slide; jib crane; 40 H.P. motor; V-belt drive
Upsetting & Forg. Machs., National High Duty, guided overarm heading slide, suspended slides, 1½", 2", 3", 4", 5"
Ajax & Acme Upsetting & Forg. Machs., not suspended slides, ¾", 1", 1½", 2½", 3"
W. W. Bulldozers, #22, #4, #24, #5, #8
Drop Hammers, 800# to 2500#
Nazel Air Forg. Hammer, #6B, Cap. 7" sq.
Bradley Hammers, Cushioned Helve, Upright & Compact
Trimming Presses, #59¼ Toledo, Tie Rod, 440-tons; other trimmers 55 to 200-ton
Bar Shears, Open & Guillotine, ⅝" to 7" Rd.
Minster 88-ton O.B.I. Press
Minster 88-ton S.S. Press, 16" stroke
Solid Back Presses, 20 to 100-ton
#94-A Toledo S.S. Double Crank, Tie Rod Press; bolster 40x36"
Bliss Knuckle Joint Press, 250-ton
Cleveland EF Sgl. End Punch, 48" throat, 1¼" thru 1"
Single & Double End Punches, various throat depths and caps.
L. & A. Multiple Punch, 8', 150-ton
L. & A. Multiple Punch, 10', 350-ton
Ryerson Serpentine Throatless Shear, ½"
#416-C Niagara Circle & Slitting Shear, ¼"
Flanging Machine, McCabe, cap. ¾"
Bertsch Straightening Roll, 1"x68"
Ryerson Friction Saws, #0, #1 & #3
Landis Threading Machine, 1", 2-Sp. lead screw, Lanco Hds., M.D., single up to 4"
BOLT, NUT AND RIVET MACHINERY, COLD HEADERS, COLD BOLT TRIMMERS, THREAD ROLLERS, SLOTTERS, HOT HEADERS AND TRIMMERS, COLD AND HOT PUNCH NUT MACHINES, POINTERS, THREADERS, WOOD SCREW EQUIPMENT.
Diamond Face Grinder, Segment Wheel 36", Table 84"x24", Hydraulic operated
Landis Motor Driven Pipe Threader, 8"
American Wheelabrator, 36x42"
Southwark 400-ton Wheel Press

DONAHUE STEEL PRODUCTS CO.
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268-1/4 TOLEDO TOGGLE PRESS
Bed 60" x 108", will draw and pull out 16", Motor Drive with 75 HP Motor.
LAFAYETTE MACHINERY CO.
3760 E. Lafayette Detroit, Michigan

Continued from Page 178

the months of June, July, and August was made by George Bernstein of George M. Bernstein & Co. The motion was seconded and passed with an amendment which stated that only moral pressure would be used to enforce the proposal.

The recent appointment of Eliot Blumberg as chairman of the MDNA nominating committee was disclosed.

NISA Hears Talk on Selling

Chicago—Les A. Thayer of the Belden Mfg. Co., Chicago, spoke on the topic Selling Against Resistance, at the Apr. 11 meeting of the Central District chapter of the National Industrial Service Assn. The meeting, held at the Electric Club, Chicago, also featured a demonstration of the Motor Master, a metal brain used for testing electrical equipment. The next meeting will be held on May 9.

Detroit MDNA Holds Election

Detroit—Edward Phelan of the Detroit Assn. of Credit Men spoke on the topic Selling on Credit at the Apr. 11 meeting of the Detroit chapter of the Machinery Dealers National Assn. held at the premises of R. A. Vine, Inc. of this city. In addition to regular business, the group elected Gorden McCutcheon of R. A. Vine to the position of president, Don Thoeming of Foster Machinery Sales to vice-president, and Herbert Marx of J. Lee Hackett Co. to secretary.

Quaker City NISA Hears Talk

Philadelphia—The Quaker City chapter of the National Industrial Service Assn. held its local meeting on Apr. 12 in this city. J. H. Previty, presiding officer, introduced R. L. Keil, guest speaker, who spoke on the topic of Refrigeration and Electric Motors. Included in the discussion of regular business was the Quaker City chapter's participation in the coming convention in Boston.

Resume Your Reading on Page 179

RE-NU-BILT
GUARANTEED
ELECTRIC POWER EQUIPMENT

D.C. MOTORS

Qu.	HP	Make	Type	Volts	RPM
1	1750	Whse.		600	550/700
1	1500	Whse.		525	600
2	1000	Whse.		450	600
1	650	G. E.	MPC	250	115/145
1	600	Al. Ch.		250	400/800
1	600	G. E.	MPC	600	650
1	600	Whse.		600	750/900
1	500	Whse.		230	300/600
1	335	Whse.	MQ	250	300/900
1	200/300	G. E.	MPC	230	360/920
1	275	Whse.	QM	230	425/850
1	230	Al. Ch.		230	700
1	250	G. E.	MPC	250	400/500
1	150	G. E.		600	250/750
1	150	Cr. Wh.	CCM	230	300/1050
1	150	Cr. Wh.	65H	230	1150
10	150	Cr. Wh.	83H-TEFC	22[illegible]	900
1	150	G. E.	MPC	230	250/450
1	100	Rel.	1050T	230	400/1200
1	100	G. E.	CD-175	230	365/730
1	100/150	Whse.	SK-300	550	600
1	125	El. Dy.	308	230	750/1500
1	115	Cr. Wh.	JHL	230	1500
1	50/100	G. E.	MPC	230	225/450
2	100	Whse.	SK-184.5	230	475/950
1	100	Whse.	SK	230	1200
1	90	G. E.	CDM-1243-Z	115	1800
1	75	Cr. Wh.	58H	230	860
1	75	Whse.	SK-180L	115	650
2	75	G. E.	CDM-1126-Y	230	2000
1	75	Cr. Wh.	CMC-65H	230	500/1500
1	60	El. Dy.	258	230	525/1050
1	60	Whse.	SK	230	500/1000
1	60	Whse.	SK-130	230	1400
1	50	Cr. Wh.	CCM	230	1750
1	50	El. Dy.	508	500	194/775
1	50	Cr. Wh.	CMC-80H	230	380/750
1	15/50	Cr. Wh.	CMC-81H	230	300/900
2	40	G. E.	CD-1129	230	850/1375
6	25/30	G. E.	CD-105	230	690/2070

MILL & CRANE

2	125	G. E.	CO-1832	230	635
2	80	Whse.	Hoist	230	415
2	50	Whse.	Hoist	230	415
4	50	Whse.	Hoist	230	400
2	30	K. E.	MD-104¼AA	550	700

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47 Howell Street, Jersey City 6, N. J.

2—MATTISON HIGH POWERED PRECISION SURFACE GRINDER: 24" x 24" x 100", Automatic down Feed and Stop 50 HP Built in Spindle motor, 10 HP Hydraulic Pump Motor, 1½ HP Hoist Motor ¼ HP Coolant Motor Mfr. Serial #14075 and #14076. Condition Like New.
2—CINCINNATI HYDROMATIC MILLING MACHINE: #56-96. Motor Drive, Table length 126⅜", Working surface 113"; Table Travel 96", Table width 24", center of spindle to table 19" maximum, 5¾" minimum. Excellent Condition.
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Care *The Iron Age*, 100 E. 42nd St. New York 17

36-90 Cincinnati Hydromatic DUPLEX Miller
5" Sellers Floor Type Horizontal Boring Mill
#30 "Tri-Way" 3" Universal Horizontal Boring Mill
#33 Lucas 4½" Horizontal Boring Mill
16" x 54" Monarch 16-speed Engine Lathe
16" Gould & Eberhardt Tool Room Shaper
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